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# Washington Roundup

## Project Forecast Begins

Project Forecast, an attempt to study the over-all future requirements of the Air Force, is getting under way in Los Angeles, away from the interruptions of Pentagon offices. Although it is being concentrated in Air Force Systems Command's Space Systems Div. complex there, it involves more than space and more than the command

## British Defense Policies

## Canada and Bomarc



## Nike X Cost Estimate

-Washington Staff

Forecast

Key Ideas

Supersonic aircraft  
Intercepter missiles  
Air Support Electronics  
Hydrogen weapons  
Long Range Ballistic  
missile  
Space support device

Col Fletcher -

Point out technical forecast is always better than the ~~policy~~ prediction of the context in which technological devices will be used.

Job of PMC panel to do better on Policy & Strategy.

Col Blaylock - Threat Panel - Fairly substantial organization

Col - Support panel



Limited to AF mission with some flexibility.

Study - 2 to 5 months

Names to help.

Pete Worden

Project Forecast

The frame work is ~~done~~ established now  
Hamburg still owns

Presumably ~~done~~

13 Technology Panels identified (What titles?)

Capability Panels

Cost, General War, Limited War, Intel & Recon

Support, Conventional Defense

These will be influenced by

Threat

Policy & Strategy

Card results will be analyzed, synthesized  
evaluated.





1 Junes  
2

## People

<sup>R&D</sup> Schriever, Ferguson, <sup>Plans</sup> Burdick  
Terhune

Redundancy, Marginal Programs, Vague values  
to counter threat, weak technological base.

Collision Course in arguments AV vs other elements  
of govt.

Role of military in space

Aerospace Defense

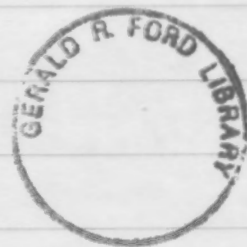
Nuclear Testing

Tactical Air

## Constraint

Economic

Purity vs Supremacy



## Reports

Force structure is objective

Format "Technical War Plan"

Annex A R&D projects for 10 years - Acquisition  
superior military postures

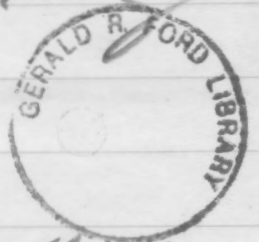
Jim - I spoke with Bennie and he asks me for  
a letter which I will send. Then he wants to go  
over it with him. Apparently he wants time to think.

Garrison's song OK'd yesterday

You may want to talk  
to BOS about Col Kord  
as Garrison's replacement.

I'll phone - verbally & by

TWY.



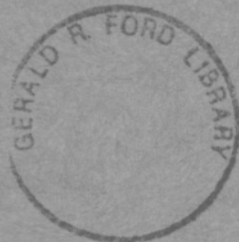
We should also talk to  
him about processing complaints  
about use of DABs (one work  
on details rather than consultation  
on major questions)

"PROJECT FORECAST"

rec'd 4/10-13/63

Dr. H. Guyford Stever

Chairman





1. TECHNOLOGY PANELS

- a. Flight Dynamics *Court Pappas*
- b. Propulsion *H. Flux*
- c. Materials *I. Scitz*
- d. Bioastronautics *McDonnell*
- e. Geophysics *Smith*
- f. Weapons *Plesset*
- g. Recce *Shengold*
- h. Detection and Surveillance *Bradford*
- i. Communication *Bradford*
- j. Data Processing and Display *Devine*
- k. Navigation and Guidance *Kerwald*
- l. ECM and ECCM *Shengold*



a. FLIGHT DYNAMICS PANEL

(1) Fluid Dynamics

(2) Aerothermoelasticity

(3) Flutter and Vibration

(4) Structures

(5) Flight Controls

(6) Deployable Aerodynamic Decelerators



b. PROPULSION PANEL

(1) Jet

(2) Turbo Jet

(3) Ram Jet

(4) Electric

(5) Solar

(6) Nuclear



c. MATERIALS PANEL

(1) Metals

(2) Ceramics

(3) Refractories

(4) Polymers

(5) Fabrication Techniques

(6) Applications



d. BIOASTRONAUTICS PANEL

(1) Life Support

(2) Aerospace Medicine

(3) Human Performance

(4) Bionucleonics



e. GEOPHYSICS PANEL

(1) Terrestrial

(2) Sub-Terrestrial

(3) Atmosphere

(4) Extra Atmosphere

(5) Oceanography



f. WEAPONS PANEL

(1) Blast

(2) Radiation (X-ray-UV)

(3) Thermal

(4) BW

(5) CW

(6) RW

(7) Radiation

(8) High Explosive (Shaped Charges)

(9) Hypervelocity Particles



g. RECONNAISSANCE PANEL

(1) Radar

(2) Photography

(3) Optical

(4) Infra-Red





h. DETECTION PANEL

(1) Radar

(2) Infra-Red

(3) Optical

(4) Sound



i. COMMUNICATION PANEL

(1) Electromagnetic

(a) Point to Point

1. Ground

2. Atmosphere

3. Space

(b) Surface to Aerospace

(c) Aerospace to Surface



j. DATA PROCESSING AND DISPLAY PANEL

All technologies employed in processing data (computers) and in presenting data for human comprehension and correlation as a basis for action.



k. NAVIGATION & GUIDANCE PANEL

(1) Electromagnetic

(2) Inertial

(3) Stellar



1. ECM & ECCM PANEL

All techniques employed in eliminating or reducing the effectiveness of any electronic device (radar, communications, etc.) plus the techniques employed to counter such action.



2. THREAT PANEL

Panel Chairman

Members



3. POLICY AND MILITARY STRATEGY

Panel Chairman

Members



5. COST PANEL

Panel Chairman

Members





6. ANALYSIS, EVALUATION AND SYNTHESIS PANEL

Panel Chairman

Maj General(Project Mgr)

Scientific Director

(Members)



## FLIGHT DYNAMICS

Recommended Chairman Col W. C. Nielson, ASD  
 Alternate Col J. O. Cobb, AEDC

### RECOMMENDED PARTICIPANTS

#### AF MILITARY

Gregg, L. Capt  
 Grimes, C. K. Maj  
 Harney, D. Maj  
 Herrington, R. M. Col  
 Horner, J. Capt  
 Jablecki, L. Col  
 Lewis, G. Maj

OSR  
 ASD  
 AEDC  
 SSD  
 SSD  
 BSD  
 SSD

Marschner, B. Col  
 Mauzy, E. L. Capt  
 Maxson, W. B. Maj  
 Rea, R. H. Capt  
 Ring, C. Lt  
 Roth, R. R. Capt  
 Stear, E. S. Lt

AFA  
 ASD  
 AFSC  
 ASD  
 AEDC  
 BSD  
 ASD

#### AF CIVILIAN

Antonatos, P. P.  
 Berndt, R.  
 Bryan, C. R.  
 Deutsch, H. K.  
 Draper, A.  
 Guderley, K.  
 Gungelbach, J. H.  
 Hankey, W.  
 Hargis, C.  
 Hoener, R. F.  
 Knemeyer, S.

ASD  
 ASD  
 ASD  
 AEDC  
 ASD  
 ARL  
 MDC  
 ASD  
 ASD  
 ASD  
 ASD

Lowndes, H. B.  
 Magrath, H.  
 Miller, W. E.  
 Mills, R.  
 Murray, P.  
 Mykytow, W.  
 Shorr, M.  
 Traenkle, C.  
 Walchner, O.  
 Xenakis, C.

ASD  
 ASD  
 ASD  
 ARL  
 ASD  
 ASD  
 ASD  
 ARL  
 ARL  
 ASD

#### OTHER

AL Ashley, H. ✓  
 Baker, R.  
 Bogdonoff, S. ✓  
 Cambel, A.  
 Dorrance, W. ✓  
 Eggers, A. ✓  
 Farber, J.  
 Ferri, A. ✓  
 AL Flax, A. H. ✓  
 Gazley, C. ✓  
 Gerard, G.  
 Graham, F.  
 Gray, W.  
 Harrington, R.  
 Heffron, C.  
 Hoff, N. J.  
 Horner, R.  
 Johnson, K.  
 Kantrowitz, A.  
 Barlow, E.

MIT  
 UCLA  
 Princeton  
 NWU  
 Aerospace  
 NAS  
 GE  
 PIB  
 CAL  
 RAND  
 NYU  
 Princeton  
 SAB  
 RAND  
 Stanford  
 SAB  
 Lockheed  
 AVCO  
 Aerospace

Lees, L.  
 Ljungren, E.  
 Miele, A.  
 Miller, R.  
 Millikan, C.  
 Oldenburger, R.  
 Perkins, C.  
 Raymond, A.  
 Sack, H.  
 Scala, S.  
 Scheerer, J.  
 Sears, W.  
 Sherman, F.  
 Stever, H. G.  
 Swanson, W.  
 Szebehely, V.  
 Van Driest, E.  
 Williams, M.

Cal Tech  
 NAA  
 Boeing  
 MIT  
 Cal Tech  
 Purdue  
 Princeton  
 DAG  
 Cornell U.  
 GE  
 Boeing  
 Cornell U.  
 UC-Berkeley  
 MIT  
 SAB  
 GE  
 NAA  
 Cal Tech



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PROPULSION PANEL

Recommended Chairman Col. H. W. Robbins, SSD  
Alternate Mr. D. Ross, RRL

RECOMMENDED PARTICIPANTS

AF MILITARY

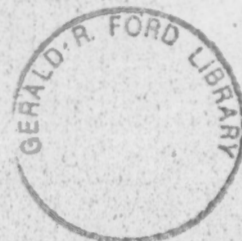
Angelus, E. W., Maj	SSD	Hoffman, R. D., Capt	BSD
Appold, N., Col	SSD	Ledford, O., Col	BSD
Baker, W. H., Maj	SWC	Mitchell, H., Capt	ASD
Boucher, Maj	USAF	Munson, C., Capt	ASD
Bovier, A. O., Maj	USAF	Norton, H. W., Col	RRL
Brooke, J., Maj	USAF	Rackley, D., Lt Col	ASD
Bunze, H., Col	BSD	Schlotterbeck, W. J., Capt	ESD
Hawkins, E. A., Col	ASD	Silk, J. M., Col	AFSC
Heaton, D., Col	NASA	Starkey, G., Capt	ASD
Hensley, R., Col	ASD		
Berthold, O. A., Maj	OAR		

AF CIVILIAN

Hevely, E. L.	AEDC	Sherman, G.	ASD
Hunter, R.	ASD	Simpson, C.	ASD
Laster, M. L.	AEDC	Slawsky, M.	OSR
Masi, J. F.	OSR	Supp, R. W.	ASD
Roy, R. E.	ASD	Von Ohain, H. J.	ARL
Scheller, K.	ARL	Worth, W.	ASD
Schnare, C. G. W.	6593RD		
ROSS, Don	RRL		

OTHER

Ayres, L.	UAC	Hawkins, J.	U. Texas
Boyer, K.	Sandia	Longmuir, D.	STL
Bussard, R.	STL	Penner, S.	Cal Tech
Cambel, A. B.	NWU	Pratt, P.	SAB
Clauser, M.	Clauser As.	Resler, E.	Cornell U
Donovan, A.	SAB	Ritchey, H.	Thiokol
Dornberger, W.	Bell	Schreiber, R.	Sandia
Ferri, A.	PIB	Stewart, H.	JPL
Flax, A. H.	CAL	Sutton, G.	SAB
Fox, R.	LRL	Tinkle, B.	RAND
Gray, J.	Princeton	Truax, R.	Aerofjet
Hage, R.	UAC	Zucrow, M.	Purdue
Hall, E.	UAC		



POWER GENERATION PANEL

Recommended Chairman Mr G. W. Sherman, ASD  
 Alternate Col R. A. Jones, ASD/LA

RECOMMENDED PARTICIPANTS

AIR FORCE MILITARY

Austin, G., Maj	SSD	Redden, E. F., Capt	ASD
Harrison, L., Lt Col	AEDC	Riefstack, C. D., Col	AEDC
Hoover, W. W., Capt	SSD	Munson, C. M., Capt	ASD

AIR FORCE CIVILIAN

Levine, M.	CRL	Soehngen, E.	ARL
Reynolds, D.	ARL	Thompson, G.	ASD
Rosenberg, N.	CRL		

OTHER

Allis, W. X	MIT	Morse, J. G.	MARTIN
Cambel, A. B.	NWU	Nottingham, W.	MIT
Carpenter, R.	AEC	Rose, D.	MIT
Colgate, S.	UC-Berk	Snyder, N.	ROYAL E.
Denholm, A.	GOODRICH	Sutton, G. W. ✓	GE
Egli, P.	PENN STATE	Szego, G.	IDA
Hasselton, R.	IDA	Wilson, V.	GE
Huth, J.	RAND	Zarem, A.	E.O
Martin, C.	TRW		



MATERIALS PANEL

Recommended Chairman Col L. Standifer, ASD

Alternate Dr A. M. Lovelace, ASD

RECOMMENDED PARTICIPANTS

AIR FORCE MILITARY

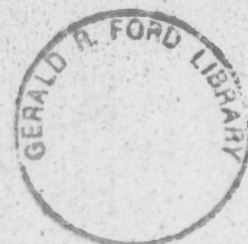
Burger, R. H., Col	AFSC	Iller, J. W., Maj	SSD
Dieffenderfer, J. C., Col	AFSC	Jones, R. A., Col	ASD
Gessner, H., Lt Col	OAR	Schlotterbeck, W. J., Capt	ESD
Hearn, J. V., Col	RTD	Shipp, J. Lt Col	USAF
Hughes, A. B., Lt Col	ASD	Dick, J. L., LtCol	OAR

AIR FORCE CIVILIAN

Bartholomew, E. R.	ASD	Krochmal, J.	ASD
Burte, H. M.	ASD	Middendorp, H.	ASD
Glass, E.	SAF	Ryan, C.	CRL
Hassell, E.	ARL	Lipsitt, Dr. H.	ARL

OTHER

Ballar, J.	Illinois	Marske, O.	US Steele
Condon, E.	Wash. U (STL)	Nicks, B.	RAND
Cross, H.	Battelle	Oldenburger, R.	DAG-ASD
Cutler, L.	Ugah	Rizzo, H.	LRL
Czarnecki, E.	Boeing	Seitz, F.	Illinois
Debye, P.	Cornell U.	Seivers, R.	ARL
Dijkatra, J.	Westinghouse	Shockley, W.	Shockley
Dow, N.	GE	Sinclair, G.	Illinois
Duwez, P.	Cal Tech	Slifkin, L.	N. Carolina
Epremian, E.	Union Carb.	Slater, J.	MIT
Ferenke, M.	Ford Motors	Slayter, J.	Owens
Fine, M.	NWU	Speiser, R.	OSU
Flory, P.	Stanford	Swope, A.	Brush
Fontana, M.	OSU	Troiana, A.	Case Tech
Gray, A.	Editor Met. Prog.	Van Horn, K.	ALCOA
Hoff, N. J.	Stanford	Wachtman, J.	NBS
Lax, B.	MIT	Zener, C.	Westinghouse



BIOASTRONAUTICS PANEL

Recommended Chairman Dr A. Hetherington, AFSC

Alternate Col J. Bollerud, USAF

RECOMMENDED PARTICIPANTS

AIR FORCE MILITARY

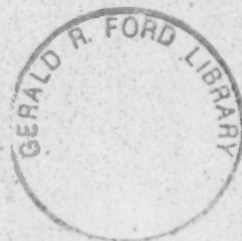
Bratt, H., Maj	FTC	Randel, H., Lt Col	AMD
Cole, E., Col	SSD	Robles, F., Lt Col	AMRL
Hekhuis, G., Col	AMD	Rowen, B., Col	ASD
Howard, R., Lt Col	OAR	Schaefer, Col	AMD
Karstens, A., Col	ASD	Stapp, J. Col	AMD
Keil, P., Col	AFSC	Swan, A., Lt Col	AMD
Martin, T., Maj	SSD	Talbut, J. Col	AFSC
Murphy, P., Col	AMD	Taylor, E. Maj	AMRL
Murphy, R. E., Col	AMD	Terry, J. Maj	SWC
Nuttal, J., Col	SSD	Westlake, E. Maj	SSD
Pickering, J., Col	AMD	White, R. Maj	FTC
		White, S. Lt Col	AMD

AIR FORCE CIVILIAN

Birnbaum, S.	ASD	Grether, W.	
Bowles, J.	PRL	Martin, W.	ASD
Doherty, W.	RADC	Ring, J.	AMR
Drury, H.	AAL	Savaly, H.	OSR
Duva, J.	ESD	Strughold, H.	AMD
Evans, J.	CRL		

OTHER

Carlson, L.		Jones, E. R.	McDonald
Carter, L.	SDC	Marberger, J.	Illinois
Commoner, V.	Wash U. (STL)	Mayer, V.	Tex A&M
Grocetti, Carlo		McDonnell G.	UCLA
Fitts, P.	DAG-ASD	Roberts, J.	Aerospace
Flickinger, B.	(B/G)	Schmidt, O.	Dag-ASD
Friede, R.	U Mex.	Van Der Wal, L.	STL



GEOPHYSICS PANEL

Recommended Chairman Dr C. Touart, AFCRL  
Alternate Maj J. Brennan, OAR

RECOMMENDED PARTICIPANTS

AIR FORCE MILITARY

Best, W., Maj  
DeGoes, L., Col  
Fletcher, J. O., Col  
Ewing, Clair, Col

OAR  
FTD  
USAF  
PMR, Pt Mugu

Holzman, B., B/Gen  
Pinson, E., Col  
Trakowski, A., Col

CRL  
OAR  
USAF ✓

AIR FORCE CIVILIAN

Barad, J.  
Champion, K.  
Cyzak, J.  
Garing, J.  
Hering, W.  
Howard, J.  
Hutchinson, R.  
Interreger, H.  
Katz, L.  
Keezan, T

CRL  
CRL  
ARL  
CRL  
CRL  
CRL  
CRL  
CRL  
CRL  
CRL  
CRL

Knecht, D.  
Lock, L.  
Rosenberg, N. W.  
Sissenwine, N.  
Sturgis, C.  
Toolin, R.  
Van Cour, R.  
Ward, F.  
Williams, O.

SWC  
CRL  
CRL  
CRL  
CRL  
CRL  
CRL  
CRL  
CRL

OTHER

Batdorf, S.  
Birch, S.  
Branscomb, L.  
Chamberlain, J.  
Fultz, D.  
Gold, T.  
Griggs, D.  
Kaplan, J.  
Kellog, W.

Aeronutronics  
MIT  
NBS  
U. Chicago  
SAB  
Cornell U  
SAB  
UCLA  
Rand

Landsburg, H.  
MacDonald, G.  
Porter, R.  
Reid, J.  
Smith, P.  
Spilhaus, A.  
VanAllen, J.  
Vollard, O.  
Whipple, F.

USWB  
UCLA  
SAB  
SAB  
Rand  
U. Minn  
Iowa  
SAB  
Harvard



WEAPONS PANEL

Recommended Chairman - Col D. Miller, USAF  
 Alternate - Col E. Giller, OAR

RECOMMENDED PARTICIPANTSAIR FORCE MILITARY

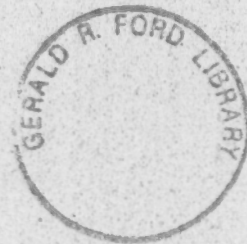
Arnold, C. Col	ASD	Keegan, R. Lt Col	USAF
Auld, H. Capt	AFSWC	McIntire, H. Col	ASD
Beckham, W. Col	AFSWC	McNeesa, G. Col	Det.4, Eglin
Berkow, J. Col	AFSC	Munyon, E. Maj	AFSC
Dean, D. Col	ASD	Nadler, R. Maj	AFSWC
Eddy, L. Col	USAF ✓	Nudenberg R. Col	AFSC
English, P. Col	AFSC	Rackley, R. Lt Col	ASD
Gregory, J. Col	Hq TAC	Smith, W. Maj	ESD
Hardaway, B. Col	Det.4, Eglin	Welsh J. Capt	AFSC
Jones, D. Col	AFSWC	Whitaker, W. Capt	AFSWC

AIR FORCE CIVILIAN

Brothers, A.	ASD	Kulp, B.	ARL
Callan, E.	ARL	Powell, H.	ASD
Ehen, J.	Det.4, Eglin	Scheller, K.	ARL
Futrell, J.	ARL	Shea, J.	Det.4, Eglin
Gustavson,	Det.4, Eglin	Sprouls, J.	ASD
Hartmyer	AFSC		

OTHER

Bauer, J.	Cornell	Martinelli, E.	RAND
Bethe, H.	Cornell	Mayer, H.	Plesset Assoc
Bing, G		McMillan, W.	RAND
Blocker, W.	Aerospace	Mechling, E.	AOA
Brode, H.	RAND	Nordisiek, A.	GM
Cook, T.	SANDIA	Pannel, J.	Linc.Lab
Early, C.	U. Mich.	Paul, W.	Harvard
Ellis, J.	RAND	Petschek, A.	Los Alomos
Foster, J.	LRL	Petschek, H.	AVCD
Griggs, D.	SAB	Plesset, E.	Plesset Asso.
Herbet, R. Herbst?	LRL	Taylor, T.	Gen Atomics
Letter, A. Latter	RAND	Teller, E.	SAB
Longmire, G.	Los Alomos	Townes, C.	MIT
Lulejian, N.	UAL	Van Atta, L.	Hughes
Mainman, P.	Consultant	Woolpert, O.	OSU





RECONNAISSANCE PANEL

Recommended Chairman - Col R. K. Rhodarmer (ASD)  
Alternate - Mr H. Holloway (ASD)

RECOMMENDED PARTICIPANTS

AIR FORCE MILITARY

Anderson, D. Capt  
Augustyn, F. Maj  
Baker, M. Capt  
Brown, G. Capt  
Grossman, F. Maj  
Hapfer, J. Capt  
Husztek, W. Lt Col

USAF ✓  
RTD  
ASD  
SSD  
TAC  
RTD  
AFSC

Keller, H. Lt Col  
Mauterer, O. Capt  
McJilton, W. Maj  
Schulte, O. Col  
Shea, D. Col  
Sides, J. Lt Col  
Smith, A. Col  
Miller, E. Col

AFSC  
RTD  
AFSC  
RTD  
USAF ✓  
USAF ✓  
USAF ✓  
OAR

AIR FORCE CIVILIAN

Boario, W.  
Caperton, O.  
De Court, H.  
Di Pentima, A.  
Gebel, R.  
Hadynski, F.  
Mallios, W.

ASD  
ASD  
RADC  
ARL  
RADC  
ASD

Ovrebo, P.  
Prior, P.  
Reck, W.  
Singer, J.  
Wolover, L.  
Woodford, C.

FTD  
ASD  
ASD  
ASD  
ARL

OTHER

Ayer, W.  
Baker, J.  
Billings, B.  
Burnett, W.  
Curry, T.  
Danskin, J.  
Davies, M.  
Everitt, W.  
Goddard, G.  
Guerjoy, E.  
Hollander, G.  
Johnson, R.  
Katz, A.

AIL  
DAG-ASD  
Linc.Lab  
NRB  
Syracuse  
Princeton  
  
Illinois  
B/Gen, ret  
RCA  
LORAC  
Watkins-Johnson  
RAND

Kearney, J.  
Lee, C.  
Myers, M.  
O'Brien, B.  
Parnet, B.  
Piety, E.  
Rambo, W.  
Riddle, R.  
Royal, D.  
Sprinkle, H.  
Storer, J.  
Whinnery, P.  
Wolf, E.

AIL  
LTV  
Sylvania  
  
Hallicrafters  
Litton  
  
HRB  
STL  
Sylvania  
Sylvania  
Berkeley  
U. Rochester



DATA PROCESSING AND DISPLAY PANEL

Recommended Chairman - Dr H. H. Zschirnt (AFCRL)  
Alternate - Col Tony Debbons (ESD)

RECOMMENDED PARTICIPANTS

AIR FORCE MILITARY

Athas, W. Lt Col	AFOSR	Little, T. Maj	BSD
Butach, L. Lt Col	ASD	Long, B. Maj	RADC
Harris, W. Maj	RADC	Netherwood, D. Lt Col	USAF
Jeffrey, S. Maj		Van Dusen, J. Capt	SSD

AIR FORCE CIVILIAN

Barnum, A.	RADC	Schrag, V.	RADC
Gabelman, I.	RADC	Tepper, S.	RTD
Hadynski, F.	RADC	Urband, R.	AFCRL
McLean, J.	RADC	Walter, C.	AFCRL
Morenoff, E.	RADC	Wooster, H.	AFOSR
Naresky, J.	RADC		

OTHER

Baskaw, T.	Columbia	McCarthy, J.	MIT
Clark, W.	MIT	Minnick, R.	SRI
Crane, H.	SRI	Minsky, M.	MIT
Dinneen, G.	Linc.Lab	Reichman, J.	Princeton
Everett, R.	Mitre	Teager, A.	MIT
Fisher, E.	No. Amer	Totias, W.	MIT
Goldberg, J.	SRI	Ware, W.	RAND
Irons, E.	Yale	Wieser, C.	Linc.Lab
Kauty, W.	SRI		
Licklider, Dr. J. C. R.	Bolt, Boranek & Newman		
Holland, Dr. John	U. of Mich		
Carr, Dr. J. W. III	U. of N. Carolina		
Garner, Mr. H. L.	U. of Mich		
Houghton, D. B.	Pittsburgh		
Madden, J. D.	SDC - SAB		
Tonge, Fred	Carnegie Tech - SAB		



DETECTION AND SURVEILLANCE PANEL

Recommended Chairman - Dr John Burgess (RADC)

Alternate - Mr F. I. Diamond (RADC)

RECOMMENDED PARTICIPANTSAIR FORCE MILITARY

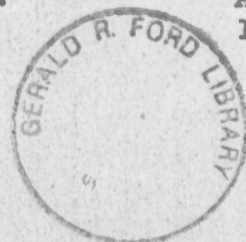
Augustyn, F. Maj	RTD	Jones, H. Maj	ESD
Brown, G. Capt	SSD	Lauritzen, T. Capt	BSD
Christie, R. Maj	AFSC	Levin, W. Lt Col	SSD
Cosel R. Lt Col	RTD	Mannon, W. Lt Col	USAF
Eames, E. Capt	ASD	Shea, D. Col	USAF
East, J. Lt Col	OAR	Shiely, A. Col	ESD
Fitch, Lt Col	BSD	Sullivan, L. Col	ESD
Flanagan, R. Lt Col	BSD	Tidball, D. Col	ESD
GAVcus, <del>Craven</del> , S. Capt	SSD	Toomay, J. Maj	ARPA
Hepfer, J. Capt	RTD	Wallace, J. Maj	SSD
Hutcheson, R. Capt	ESD	Wear, T. Lt Col	SSD
Jensen, W. Lt Col	SSD		

AIR FORCE CIVILIAN

Bradley, F.	RADC	Lazarus, W.	APGC
Byram, H.	ESD	Lewis, E.	AFCR
Cavitch, D.	APGC	Lliff, E.	AFCR
Conley, T.	AFCR	Mawdsley, R.	ASD
Craven, W.	HAC	Meuser, L.	ASD
Feik, R.	RTD	Newman, P.	AFCR
Frolich, R.	RADC	Parrara, R.	RADC
Garing, J.	AFCR	Pasek, J.	ASD
Gassman, G.	AFCR	Pfister, W.	AFCR
Gauvin, H.	AFCR	Polito, M.	USAF
Hadlock, C.	HAC	Ring, W.	AFCR
Haskell, N.	AFCR	Rosenberg, N.	AFCR
Howard, J.	AFCR	Sletten, C.	AFCR
Kissell, K.	ARL	Stair, A.	AFCR
Klabo, L.	ASD	Vance, W.	AFCR
Krautman, L.		Wahl, E.	AFCR
Diamond, F. I.	RADC		

OTHER

Alexander, B.	ARPA	Osgood, D. Col ret	
Baker, J.	Baker-Nunn	Passman, S.	RAND
Baun, W.	Mt Wilson Obs	Phson, J.	Aerospace
Beckerley, J.	Schlumberger	Sheingold, L.	Sylvania
Chrisholm, J.	Linc. Lab	Siegel, K.	Conductron
Crain, C.	RAND	Skifter, H.	AIL
Duke, D.	Hughes	Valley, G.	MIT
Freedman, J.	Linc. Lab	Villard, O.	SRI
Fubini, E.		Von Handel, P.	IDA
Graham, W.	RAND	Weiss, H.	Linc. Lab
Hoffman, W.	Boeing	Wilson, A.	RAND
Hyneck, J.	Northwestern	Zirkind, R.	ARPA
Morton, G.	RCA	Zissis, G.	IDA
Naka, R.	Mitre		



NAVIGATION AND GUIDANCE PANEL

Recommended Chairman - Col Pat Box (SSD)  
Alternate - Col Richard Gibson (OAR, AFA)

RECOMMENDED PARTICIPANTS

AIR FORCE MILITARY

Booth, R. Col  
Carnahan, K. Maj  
Duffy, R. Col  
Hall, H. Capt  
Howland, J. Maj  
Johnson, A. Capt  
Jorten, H. Maj

USAF ✓  
BSD  
BSD  
SSD  
USAF  
SSD  
AFA

Little, T. Maj  
Osburn, P. Capt  
Stephenson, H. Maj  
Sugerman, L. Maj  
Teubner, H. Col  
Wall, O. Maj  
Anderson, Maj C.

BSD  
AFSC  
USAF  
RTC  
USAF ✓  
SSD  
OAR

AIR FORCE CIVILIAN

Doran, R.  
Guenther, A.  
Jaenke, M.  
Kissel, K.  
Martell, J.  
Nordlund, R.

ASD  
AFLC  
AFMDC  
ARL  
ESD  
ASD

Panara, R.  
Perdsock, R.  
Rynda, T.  
Schisler, H.  
Westbrook, C.

RADC  
ASD  
ASD  
ASD  
ASD

OTHER

Albert, B.  
Banta, F.  
Blasingame  
Draper, C.  
Farrior, J.  
Bucheim, R.

Illinois  
GPI  
ADSP  
MIT  
Lockheed  
RAND

Herwald, S.  
Hursh, J.  
Israel, L.  
Roberson, R.  
Shiff, L.

Westinghouse  
MIT  
Ford  
Consultant  
Stanford



COMMUNICATION PANEL

Recommended Chairman - Col Grover White (USAF) ✓  
Alternate - Mr. Robert Alexander (AFCRL)

RECOMMENDED PARTICIPANTS

AIR FORCE MILITARY

Fitch, Lt Col	BSD	Povalski, J. Lt Col	SSD
Matson, K. Capt	RTD	Tiernan, J. Capt	SSD
Nelson, R. Maj	OAR	Townsend, J. Col	ESD
Palmer, L. Col	RADC		

AIR FORCE CIVILIAN

Aarons, J.	AFCRL	Newman, P.	AFCRL
Bradbury, R.	AFCRL	Orange, J.	AFCRL
Braun, W.	ARL	Rotman, W.	AFCRL
Hallgrimson, J.	ESD	Ryerson, J.	RADC
Higginbotham, L.	ASD	Scheer, G.	ASD
Kelly, W.	RADC	Sen, W.	ESD
Lewis, E.	AFCRL	Sletten, C.	AFCRL
Martin, G.	AFCRL	Strom, C.	RADC
Morgan, L.	ASD	Wach, O.	ESD
Mott - Smith, J.	AFCRL		
Alexander, R.	OAR		

OTHER

Braham, H.		Kirby, R.	NBS
Brennan, D.	Hudson Inst.	Leman, S.	Aerojet
Brown, R.	U. Mich	Lewis, C.	Westinghouse
Brown, S.	MIT	Mathews, N.	NSA
Buck, F.	NSA	Morrow, W.	Linc.Lab
Castruccio, P.	Westinghouse	Nicolet, M.	Penn State
Charyk, J.	Comsat	Pierce, J.	Bell Tel
David, E.	Bell Tel	Powers, K.	RCA
Derosa, L.	ZTTCS	Ramo, S.	TRW
Elias, P.	MIT	Reiger, S.	RAND
Feistel, H.	Mitre	Rogers, T	
Finer, A.	Hughes A/C	Schriever	MIT
Flanagan, J.	Bell Tel	Shannon, C.	MIT
Green, D.	MIT	Sherman, H.	MIT
Huffman	MIT	Sherwin, C.	Aerospace
Huggins, W.	Johns Hopkins	Villard, O.	Stanford
Jacobs	Bell Tel		
Lax, Ben, Dr.	Lincoln Labs		



ECM AND ECCM PANEL

Recommended Chairman - Col Frank Lindberg (ASD)

Alternate -

RECOMMENDED PARTICIPANTS

AIR FORCE MILITARY

Folin, O. Capt	ASD	McPhie, J. Lt Col	AFSC
Garrigus, Maj	FTD	Purdy, E. Lt Col	SSD
Gregory, J. Maj	RTD	Stevens, J. Capt	ASD
Hall, W. Capt	ASD	Sybenga, Maj	
Hesse, A. Lt Col	USAF ✓	Thompson, R. Lt Col	AFSC
Hyslop, J. Capt	BSD	Vaughn, Capt	BSD
Kester, W. Maj	SSD	Witry, F. Col	SAC
Kilgore, H. Maj	RADC		

AIR FORCE CIVILIAN

Barkley, M.	ASD	Munzen, E.	RADC
Caperton, O.	ASD	Porter, O.	RADC
Cataneareite, F.	ASD	Portune, W.	ASD
Dix, W.	ESD	Runniger, J.	ASD
Ennarino, J.	RADC	Yeck, R.	AFFTC
Herzing, M.	ASD	Stimmal, R.	ASD

OTHER

Bark, A.	Mittra	Miller, F.	DCA
Chodorow, M.	Stanford	Rambo, B.	Stanford
Hamburger	Johns Hopkins	Ryder, J.	Mich State
Herbert	RAND	Siegel, K.	U. Mich
Hult	RAND	Tatum, F.	RAND
Kock, W.	Bendix	Zaccari, S.	RADC
Mallitt, J.	RAND		
Marcenau, H.	Yale		



PROJECT FORECAST

Threat Panel



L/Col MM. KAUFMANN (AFNIN)

① COL. WA FARRIOR (AFNIN), ② COL. AE STOLL (AFNIN)

Chairman Gen  
Secy G-8

L/Gen JOHN A SAMFORD, GEN CHARLES P. CASELL

L/① R. WENIGER (CIA), L/② L. LUDFORD (CIA)  
③ COL. B. GILLER (CIA)

① COL. JOHN REED (DIA), ② COL. R.R. SHOOP (DIA)

WEST COAST

WASHINGTON

To be established by ACS/I Deputy Chairman - Col (May be existing staff organization preferably within AFNIN - with appropriate Hq AFSC, FTD, DIA, CIA, Command, and RAND liaison or augmentation.)

Deputy Chairman Gen  
Asst Col or L/C  
Secy G-6

① B/q G.C. BROWN (DIA), ② COL. R.T. CARLISE (FTD)  
③ COL. W.M.T. STEWART (AFNIN)  
④ COL. R.T. CARLISE (FTD)

Intel Liaison Off  
DIA  
CIA  
ACS/I  
Admin Asst  
Secy G-6

Req. Program, & ORC Eval. Office  
Col  
Lt Col  
T/Sgt  
Secy G-6

COL LT. GLASER (SCF)  
① L/Col J.J. HENDERSON (FTD), L/Col B. THORNTON (FTD)  
② MAT DL. ARNOLD (IAUSAF) ③ L/Col H. CONEY (MOC)  
④ S/Sgt K.R. KOGER (FTD), S/Sgt WH. CONEY JR. (FTD)

① COL. J.H. MACIA (AFSS) MR. DAVIES (RAND)  
② COL. P. EVANS (AFNIN)

Operational Control

Panel Liaison Group  
Missile Systems  
Space Systems  
Acrodynamic  
Comm & Con Sys.  
Secy (2)  
Payloads  
Bio Astronautics  
Materials  
Propulsions  
Electronics

I & R Panel  
AFNIN, AFSC, AFSS, RAND  
personnel as appropriate.  
COL FT BRADLEY (DIA)  
CAPT DE GRANVILLE (AF)  
MAJ J.H. WINTERHALTER (AFSS)  
MR. W. PERKINS (FTD)  
MR. F. KOURI (FTD)

L/Col JC MAJATT (SSD)  
L/Col MD MITCHELL (FTD)  
L/Col E.W. KISLING (FTD)  
L/Col J.C. BERGONZI (SSD)



NATIONAL POLICY & MILITARY DOCTRINE

FULL TIME		PART TIME			
Air Force		Other	Air Force		Other
Military	Civilian	Civilian	Military	Civilian	Civilian
MGen Jerry D Page, USAF MGen L P Hopwood, ATC  BGen John Vogt, ISA BGen N D VanSickle, ATC Col J O Fletcher, XPDPA Col W Posvar, AFA Col C Bennett, XPDPL Col C W Meechum, AU Col R A Weir, XPDPL Col Wayne Yeoman, AFA LCol Mark Orr, XPDPA LCol J E Paschall, AFSC  Col J J Lee, Air Staff  *Capt J A Welch, AFSC		Dr Alex George, RAND Mr Sam Cohen, RAND	MGen D O Smith, JCS MGen P S Emrick, JCS MGen S J McKee, SAC MGen J D Stevenson, AEC-TAC- NATO MGen R E Warren, AFA BGen N Parrish, AU BGen G S Brown Col W B Robinson, State Col Sid Fisher Air Staff Col Marshall Sanders, XPDPA	Thos W Wolfe, RAND Herb Dinerstein, RAND Dr Leon Goure, RAND	Dr S Possony, Stanford Dr Tom Schelling, Harvard Gen F H Smith LGen R Lindsay MGen J Whisenand Mr Garry L Quinn, OSD- ISA Dr Herman Kahn, Hudson Institute Dr Bernard Brodie, RAND



**COST**

FULL TIME		PART TIME			
Air Force		Other	Air Force		Other
Military	Civilian	Civilian	Military	Civilian	Civilian
*Col C Reber, AFSC LCol T Franklin, AFSC	Mr R P Schuzza, ESD Mr A D Yaross, ASD Mr Fred Jacke, BSD Mr L E Tomlin- son, SSD Mr Leo A Fritz, BSD Mr Fred Vick, Air Staff Mr Dick Carr, Air Staff	D Novick, Rand B Petruschell, Rand M Margolis, Rand	MGen R J Friedman Col W H Mac- donald, AFA CdGS Boylan, Air Staff Col Harry Dwyer, Air Staff Col <sup>M.S.</sup> Benedict, Air Staff	Mr K A Conley, Air Staff	Claire Wood - Industrial



**GENERAL WAR**

FULL TIME		PART TIME		
Air Force		Other	Air Force	Other
Military	Civilian	Civilian	Military	Civilian
MGen J C Mever, SAC MGen Seth J McKee, SAC MGen A J Russell, SAC Col J C Jennison Col L V Gossick, ✓ Air Staff Col I J Klette, CINCARIB Col Andreas A. Andreae, 8th AF Col Robert T Robinson, 15th AF Col Manning, SAC  Col W R MacDonald, Air Staff G W Mulling, SAC		R. A. Davis, Aerospace  Allen McCaskill, ANSER	BGen R C Richardson, SHAPE Col M Nielson, MIT  Col Howard, XPDPA	Mr N Rich, ACDA  Carroll Zimmerman - Douglas  Herman Kahn - Hudson Institute  Fred Hoffman, RAND



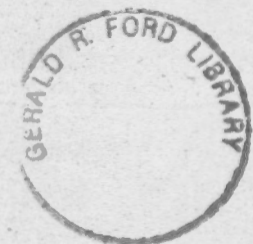
LIMITED WAR

FULL TIME		PART TIME	
Air Force		Other	
Military	Civilian	Military	Civilian
BGen Fred C Gray, TAC	Mr J Reamer, ASD	BGen G L Pritchard, Eglin	MGen Fred Sutterlin
BGen A T Culbertson, APGC		Col B H King, Eglin	Al Shapiro - SRI
BGen G E Pinkston, TAC		Col J J Berkow, AFSC	
Col P English, AFSC		Col H McIntire, ASD	
Col Chester A Jack, APGC		Col Gregory, DORQ-TAC	
Col R Triantafellu, TAC		Col Robert Cardenas, STRICOM	
LCol H C Aderhold, Eglin			
LCol W McClanahan, Eglin			
Maj Wm Moran, APGC			
Col George Lavin, Air Staff			
*Col E S Davis, Air Staff			
Col McBride, XPD-PA			
Capt J S Pustay, AFA			



**INTELLIGENCE & RECONNAISSANCE**

FULL TIME		PART TIME			
Air Force		Other	Air Force		Other
Military	Civilian	Civilian	Military	Civilian	Civilian
BGen Harris B Hull, NORAD		Merton Davies, RAND	LGen G A Blake, NSA		MGen H E Watson, G. E.
BGen Wm B Latta, NORAD		Gayle Mays, ANSER	BGen R N Smith, SAC		R Ferrell, IBM
BGen Robt N Smith, SAC		Jack Gilroy, ANSER	Col E L Sterling, ACIC		
Col R Triantafellu, TAC		John Huntzicker, RAND			
Col Cornelius E. McBrayer, Sec Svc		Mr Thos Finney, ACIC			
Col J H Macia, Sec Svc					
Col Phil Evans, AFCIN					
Col Francis Cappelletti, SAC					
Col Malcolm D Seashore					
Col Russell Gardinier, AFNIC					
Col Philip Evans, AFNIC					
Col Jas A Shannon, Air Staff					



**SUPPORT (SPACE)**

FULL TIME		PART TIME			
Air Force		Other	Air Force		Other
Military	Civilian	Civilian	Military	Civilian	Civilian
*BGen A J Kinney, AiStaff ✓	Dr Mike Weeks, Aerospace	Dr Dick Jordan, ANSER	BGen H Evans JCS		N Lulejian, DAG-BSD
BGen R Curtin, Hq USAF		Robt Robinson, ANSER	Col H Shepherd		
Col F X Kane, Hq AFSC ✓					
Col D Carter, Hq AFSC					
Col J Ryan; ESD					
Maj S Hislop, SSD					
Capt A M Crews, 6594th, Sunnyvale					
Capt M J Standish, 6594th, Sunnyvale					



**AIR DEFENSE**

FULL TIME

PART TIME

Air Force

Other

Air Force

Other

Civilian

Civilian

Military

Civilian

Civilian

MGen A C Agan, NORAD  
 BGen J H Bell, NORAD  
 BGen J T Robbins  
 BGen H A Hanes, ADC  
 Col J F Kirkendall  
  
 Col J Kelas, ADC  
  
 Col Morgan, ADC  
  
 Col J D Day, ADC  
  
 Col J F Curry, NORAD  
  
 Col Wilson Earle, AFSC  
  
 \*Col J R Carter, Air  
 Ataff

James F Digby,  
 RAND  
  
 Sam Tennant,  
 Aerospace  
  
 John Mallett,  
 RAND  
  
 Ray Timon,  
 ANSER

James Freih, ADC  
  
 Wm Stillman,  
 NORAD

W. Graham, DAG-SSD



MAY 7 1963

DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS UNITED STATES AIR FORCE  
WASHINGTON 25, D.C.



REPLY TO  
ATTN OF: AFBSA

2 May 1963

SUBJECT: Project Forecast

TO: Colonel Gasser

Colonel Pete Taylor called from "Forecast" Headquarters and reported that General Schriever wants a meeting in mid May of the following:

- Mr. Frank Collbohm
- Mr. James H. Doolittle
- Dr. John S. Foster
- Dr. Ivan A. Getting
- Mr. Trevor Gardner
- Dr. Lawrence A. Hyland
- Dr. Charles C. Lauritzen
- General N. F. Twining
- Dr. Herbert York

He requested SAB affiliations of the Group. Only Doctors Foster and Getting are members.

*[Signature]*  
 JAMES E. MILLER  
 Lt Colonel, USAF  
 Asst. Secretary  
 USAF Scientific Advisory Board



*Wtd*

3 May

*Hey - I think you should be aware of this - are you involved?*

*Cyde*

*Wtd - Talked with Cyde on May 9, 1963 suggests I call Schriever.*

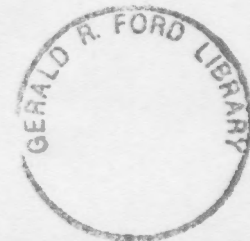
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APR 29 1963

DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS UNITED STATES AIR FORCE  
WASHINGTON 25, D.C.



25 April 1963



Dr. H. Guyford Stever  
Head, Dept of Mechanical Engineering  
Room 3-174  
Massachusetts Institute of Technology  
Cambridge 39, Massachusetts

Dear Guy

Further to our phone conversation of this date on publishing and distribution of the results of the April General Board meeting, and on Project Forecast, the following items are furnished as confirmation of my understanding of your instructions, as reminders of things you should be aware of, or as additional information.

Dan Whitcraft is currently with us on a two-week active duty tour and is reducing the April General Board meeting proceedings to appropriate form. Included are the addresses of principal speakers (except Jerry Wiesner's, to which only reference will be made) on the 11th and also the reports by Panel-Group Discussion Chairmen which occurred on the 12th. In the instance of the addresses of principal speakers, per your instructions these addresses will be distributed to all members of the Board (including Associate Advisors) and also to Project Forecast management. A suitable preface will accompany them to the extent that the addresses per se represent the views of the individual speakers and do not necessarily have SAB endorsement.

The second major thing Dan is doing is to prepare the official SAB report on the April General Board meeting. Included will be a precis of each address made by principal speakers together with the (full) reports made by the Panel-Discussion Group Chairmen. In the instance of referenced precis, we will again include a suitable preface that they are the views of individual speakers and do not necessarily have SAB endorsement. Other pertinent information will also be included in this report, i.e., agenda, attendance, Panel-Discussion Group information, etc. Distribution will be determined in the routine manner via contacting the appropriate echelon in General Ferguson's DCS/R&D organization.

On Project Forecast, it is my impression that the integration on a part-time or full-time basis of scientific/technical advisory services from the Board and elsewhere at the Project Forecast working level, is

*Noted*

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progressing in a satisfactory manner. I have talked to two or three Panel Chairmen who have advised that they have responded as requested during the 12 April Executive Committee meeting. Similar to your remarks of this date, those with whom I have spoken have expressed some apprehension regarding the size of the Project force being recruited, and also the anticipated nature of the end product. Administratively, I am doing nothing in support of Project Forecast since no instructions were passed to me during the 12 April Executive Committee meeting and none have since been received. We are, of course, standing by ready to do anything we can.


I should like to remind you of General Schriever's desires to assemble a small top level advisory group from the SAB, headed up by yourself, to meet with him sometime in May. As I understand it, General Schriever will call you when he is ready to convene a meeting and you will select those from the Board who you feel should serve with you. It is my feeling that the importance of this particular group should not be underestimated, and that you should personally do everything possible to insure that the advisory services being provided from the SAB roster (at both your advisory group level and at the working group level) are used in the most effective and efficient manner. You should be particularly alert to the possibility of formal or informal statements being made at the conclusion of Project Forecast to the effect that it is approved or otherwise underwritten by the SAB.

Informal advice has come to me in the past few days that the originally predicted duration of Project Forecast (April through July) has now been extended to August or September. This same point was raised during the 12 April Executive Committee meeting where some members observed that they felt the product of the Project would not be available in final form in time for the October General SAB meeting. An additional item brought to my attention this morning is that General Twining, who has agreed to serve as an advisor on Project Forecast, has expressed concern regarding the end product of the Project. His concern seemingly stems from his belief that the Project will be comprised primarily of a "building block" approach to the extent where it will be difficult to identify end item weapon systems and associated operational concepts. He further feels that the Project (pending its conclusion) will have the effect of a moratorium on other important things that might be processed during the interim. A not unrelated view was expressed recently by Dr. Carter to me wherein he felt that the Project objectives and plan of action were currently ill-defined. You and other members of your special advisory group may want to take a hard look at these matters when you meet with General Schriever.



As mentioned in our phone conversation this morning, there are several other actions underway in the Secretariat arising from the 12 April Executive Committee meeting proceedings. Each of these is being treated separately and you, Court Perkins, General Ferguson, and others have already been or soon will be advised. In connection therewith, I will appreciate your early response to the Tentative Agenda for the 14 May Steering Committee meeting, a copy of which was sent to you yesterday.

Sincerely

  
CLYDE D. CASSER

Colonel, USAF

Secretary

USAF Scientific Advisory Board

cc:- Prof Perkins  
Gen Ferguson



DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS UNITED STATES AIR FORCE  
WASHINGTON 25, D.C.



22 March 1963

Dr. H. Guyford Stever  
Head, Dept. of Mechanical Engineering  
Room 3-174  
Massachusetts Institute of Technology  
Cambridge 39, Massachusetts

*Is Carter being  
excluded*

*This is important*

Dear Guy

Per our conversation and your request on 21 March re Project "Forecast", and as a reminder to you for your discussion relevant thereto with General Schriever on 5 April, the following suggestions on ways and means to facilitate SAB assistance are provided:

a. I feel that such aid as is furnished by the Board either from its 70 plus 11 man regular roster, or in the form of Special Advisors from at large, should be made available in a manner generally similar to that which is followed in the instance of DAGs.

b. The existing DAG organizations do not necessarily lend themselves exactly (on a disciplinary basis) to fulfilling the tasks now being identified in Project Forecast; however, they come reasonably close and can be augmented or otherwise modified to do so. One or two additional "temporary DAGs" may be needed to accommodate the spread of technical/operational tasks now being identified in the Project.

c. Since all SAB-sponsored panels or groups are composed of part-time advisors, the DAG complex to support Project Forecast should convene only when actually needed from time to time, to advise at the Project working group levels and at the top Project management level. Additionally, individuals, or two or three member groups of the total SAB party advising the Project, can from time to time provide special consultant services in the manner they now do on behalf of the Board.

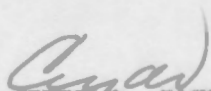
d. It is assumed that in providing such Board services, we will be expected to "pick up the check" for travel, per diem and fees as applicable. If this is the case, and it probably is, I am of the opinion we will need more money than is now in the budget for

*W*



the remainder of this F.Y. Additionally, I should again like to warn you, Prof Perkins and General Ferguson that many of those on the Board who will undoubtedly be called upon are already seriously overworked. Further, a few are getting dangerously close to the upper level limit of employment for this F.Y. as part time or "Special Government Employees" (the current categorization of SAB members).

Sincerely

  
CLYDE D. GASSER  
Colonel, USAF  
Secretary  
USAF Scientific Advisory Board

cc:- Prof Perkins  
Gen Ferguson



Fabian - Chul Sherman  
Brook's on Gd Flex

Resonance

Suggestion

Bolton

Chairman of Personnel Panel

Chairman  
Personnel  
Flex

Chairman of OAC

Clyde Lewis  
Early Term of  
14th June



O'Brien  
Herwald

Rudford  
McDonald

Mellisham

Lets save Chief Secretaries  
Break down of Rapport between  
Ferguson and Carter

Deans with Pe May and Boyd 14th  
Med Chief Secretariat report to  
Chief of Staff

MAY 9 1963

H E A D Q U A R T E R S  
AIR FORCE SYSTEMS COMMAND  
UNITED STATES AIR FORCE  
ANDREWS AIR FORCE BASE  
WASHINGTON 25. D. C.



6 MAY 1963

Dr H Guyford Stever  
Department of Aeronautics  
Massachusetts Institute of Technology  
Cambridge, Massachusetts

Dear Guy

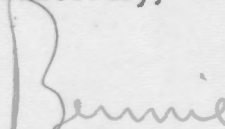
You will recall our earlier discussions on Project FORECAST during SAB and Board of Visitors meetings. Your comments have proved to be stimulating and helpful in providing me with additional insights on our early planning for the project.

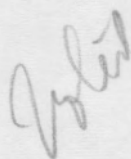
As you know, FORECAST is assuming growing importance as one of the major planning efforts underway in the Department of Defense at this time. Therefore, it becomes even more vital that each major phase of our work be carefully considered in order that changes in emphasis or direction required can be accomplished immediately.

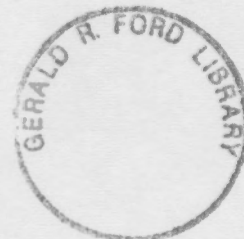
Due in no small measure to your wonderful spirit of cooperation in providing such support as has and will be required by SAB personnel, FORECAST is rapidly assembling a team of outstanding personnel on the west coast and has already begun operations according to plan. In order to insure that our effort is effective and our product the best that can be produced, I should like to be able to continue to call on you personally from time to time to provide me with your thoughts on the various problems which will arise during the course of the exercise.

As exact planning firms and critical milestone dates are identified and established, I will get in touch with you in the hope that your schedule will permit you to join me in further discussions on FORECAST. Administratively, and in accordance with our earlier agreement, such visits can be handled by Clyde Gasser.

Sincerely,

  
B. A. SCHRIEVER  
General, USAF  
Commander





MAY 20 1963

DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS UNITED STATES AIR FORCE  
WASHINGTON 25, D.C.



16 May 1963

Dr. H. Guyford Stever  
Head, Dept of Mechanical Engineering  
Room 3-174  
Massachusetts Institute of Technology  
Cambridge 39, Massachusetts

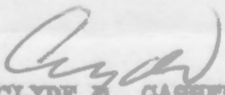
Dear Guy

Per our discussion in your office during the week of 6 May re people who are being recruited from the Board's roster on behalf of Project Forecast, while I was in Los Angeles on the 14th to attend the von Karman Services, I took time out to discuss applicable matters with Colonel Pete Taylor and Lt Colonel Billy Gray.

As a result, Pete furnished me with the attached list which admittedly, is a "rough cut" and does not indicate whether the services to be provided are part or full time. In reviewing the names, however, it seems pretty obvious to me that such services to be rendered will, in the main, be part time. Additionally, two of the people listed (Lauritsen and Puckett) are not now members of the Board and because of the position now occupied by Flax, I doubt seriously whether he will have much time to contribute to Project Forecast.

We will continue to follow this matter and will keep you informed.

Sincerely

  
CLYDE B. GASHIER  
Colonel, USAF  
Secretary  
USAF Scientific Advisory Board

Atch  
a/s

*Noted -  
Save for Exec Comm or West*



PROJECT FORECAST

<u>NAME</u>	<u>CURRENTLY ENGAGED</u>	<u>CONTACTED AND HAS TENTATIVELY ACCEPTED</u>	<u>CONTACTED - NO ANSWER</u>
DINNEEN, Dr. Gerald P.			X
DONOVAN, Mr. Allen F.	X		
FLAX, Dr. Alexander H.		X	
FOSTER, Dr. John S., Jr.		X	
GETTING, Dr. Ivan A.		X	
GRIGGS, Prof David T.			X
HERWALD, Dr. S. W.		X	
HORNER, Mr. Richard E.			X
KAPLAN, Prof Joseph	X		
LAURITSEN, Dr. Charles C.		X	
MCCORMACK, M/G James, USAF (Ret)			X
MCDONNELL, Dr. Gerald M.		X	
MILLIKAN, Dr. Clark B.			X
O'BRIEN, Dr. Brian			X
PERKINS, Prof Courtland D.		X	
PLESSET, Dr. Ernst H.		X	
PUCKETT, Dr. Allen E.			X
RADFORD, Dr. William H.		X	
SHEINGOLD, Dr. Leonard S.			X
SMITH, R/Adm Paul A., C&GS (Ret)		X	
STEVER, Dr. H. Guyford		X	





DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS UNITED STATES AIR FORCE  
WASHINGTON 25, D.C.



7 June 1963

**SAB Participation in Project Forecast**

**Memo for Record**

The following notes reflect the understanding had between Col J. P. Taylor, AFSC, and myself re subject matter as of this date.

a. Assistance in Project Forecast activities is to be provided upon request by appropriate AFSC authority from SAB-sponsored sources, i.e., the Board, per se, in terms of the Chairman/Vice Chairman, its senior statesmen, panel members and Board-sponsored DAGS, subject, of course, to the concurrence and availability of each individual.

b. Expenses incurred via the SAB-sponsored assistance cited above will be borne by the SAB provided services rendered are on an intermittent basis similar to that provided in normal SAB-sponsored panel, ad hoc committee and DAG activities. Referenced expenses will be those arising from travel, per diem and the standard SAB fee where authorized. The nominal number of days per month for such intermittent services will be ten.

c. In the instance of those SAB members who may be recruited on Project Forecast under long term and continuous conditions (a continuous period of 30 days or more during the summer months), such services will be acquired via contract arrangements to be executed by AFSC with the National Academy of Sciences. All expenses incurred, including travel, per diem and fees, will be accommodated by the NAS and not the SAB.

d. In those instances where SAB members are asked to serve on an intermittent basis (re paragraph (b) above) but do not wish to serve under SAB financial auspices because of the inequity between the fee available through the SAB and that available through the NAS, such individuals should be hired under the NAS contract by AFSC in the same manner as referenced long-term hirings are accommodated.

e. In the instances of SAB members who are hired on Project Forecast under either the intermittent service plan or long-term service plan, all pertinent operations matter will be handled by appropriate Project Forecast management echelons and not the SAB. The SAB Secretariat is, however, to be provided copies of applicable correspondence in order that the Secretariat may keep accurate account of man hours expended and, where appropriate, fund expenditures.

*W. J. Taylor*



f. In the instance of the aforementioned intermittent services which are financed by the SAB, it will be necessary that the SAB Secretariat be kept informed promptly of such services in aid of facilitating Secretariat responsibilities in issuing travel authority and all other attendant administrative requirements. Advance notice of these intermittent services is desired.

g. Required also from applicable Project Forecaster authorities will be an accounting of the total man hours expended by SAB members whose travel, per diem and fee expenses are borne by the SAB. The sum total of these man hours should be provided to the Secretariat well before the end of this calendar year (not later than mid-November) in order that appropriate notation may be made in the Board's annual report for calendar year 1963 which is to be submitted to the Secretary of the Air Force and to the Chief of Staff in December of 1963.

CLYDE B. GASSER  
Colonel, USAF  
Secretary  
USAF Scientific Advisory Board

*Noted*



FM HQ USAF  
TO DR. H. GUYFORD STEVER  
DEPARTMENT OF MECHANICAL ENGINEERING  
MASSACHUSETTS INSTITUTE OF TECHNOLOGY  
CAMBRIDGE MASS

JUN 7 1963



*have downgraded  
this - b*

BT  
67690 GENERAL LEMAY, S LETTER TO YOU OF 20 MARCH 63 ON  
PROJECT FORECAST IS HEREBY DOWNGRADED TO UNCLASSIFIED.  
ALSO DOWNGRADED ARE LETTERS TO THE RAND CORP AND TO  
GENERAL SCHRIEVER ON THE SAME SUBJECT.

BT  
05/1518Z JUN RUEAHQ

March 22, 1963

~~log #441~~

General Curtis E. LeMay  
Chief of Staff  
U. S. Air Force  
Pentagon  
Washington 25, D. C.

Dear Curt:

We on the Scientific Advisory Board are honored and pleased to be asked to participate in Project FORECAST. I can assure you we will do our best.

I will be in touch with Bennie Schriever in the very near future to discuss our ways of participating.

Best regards,

Sincerely yours,

H. Gayford Stever

HGS:mlm  
cc: Prof. Perkins  
Col. Gasser



~~CONFIDENTIAL~~

DEPARTMENT OF THE AIR FORCE  
OFFICE OF THE CHIEF OF STAFF  
UNITED STATES AIR FORCE  
WASHINGTON, D.C.



REPLY TO  
ATTN OF: AFCCS

SUBJECT: Project FORECAST

20 March 1963

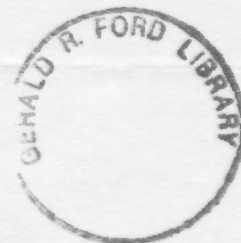
to: Dr. H. Guyford Stever  
Department of Mechanical Engineering  
Massachusetts Institute of Technology  
Cambridge 39, Massachusetts

Dear Guy

1. I have recently directed Bennie Schriever to undertake on an urgent basis a comprehensive study and analysis of the Air Force structure projected into the 1965-1975 time period. The impact of science and technology on the future role of the Air Force will be a primary consideration in this study.
2. The importance of this effort to the national security and the wide range of problems to be studied require the utilization of all appropriate resources available to the Air Force. The Scientific Advisory Board, by its very nature, can play a vital role in this study effort to be known as Project FORECAST.
3. I am heartened and pleased that in previous discussions with Bennie you have offered your support and that of the Scientific Advisory Board in this important program. I feel sure that details on the Board's activities can be worked out between you and Bennie. In this connection, I was pleased to note that the agenda for the next SAB meeting provides an interesting backdrop for Project FORECAST.

Sincerely

CURTIS E. LeMAY  
General, USAF  
Chief of Staff



~~CONFIDENTIAL~~

downgrade to uncl.  
by Hq. USAF on 6/5/63

JUN 28 1963

MASSACHUSETTS INSTITUTE OF TECHNOLOGY  
LINCOLN LABORATORY  
LEXINGTON 73, MASSACHUSETTS

VOlunteer 2-3370

26 June 1963

Colonel Grover C. White, Jr.  
Chairman, Panel on Communications  
Project FORECAST  
c/o Space Systems Division, USAF  
Inglewood, California

Dear Colonel White:

It occurred to me that the Project FORECAST Panel on Communications might find the following Scientific Advisory Board reports interesting and helpful:

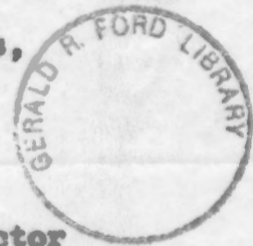
Report of the SAB Electronics Panel on Air Force Communications Problems - 26 April 1960

Report of the SAB ad hoc Committee on Passive Satellite Communications - 20 October 1961

I assume that copies of these reports are available at SSD. In any case, they may be obtained from the SAB secretariat. You might also be interested in the Air Staff comments on the reports, copies of which are on file in the SAB office.

Sincerely yours,

W. H. Radford  
Associate Director



cc: H. G. Stever

*Noted*

SEP 20 1963

DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS UNITED STATES AIR FORCE  
WASHINGTON 25, D.C.



REPLY TO  
ATTN OF: AFBSA

18 September 1963

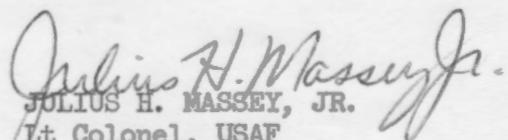
SUBJECT: Letter of Authorization

TO: Dr. H. Gayford Stever  
Head, Department of Mechanical  
Engineering  
Massachusetts Institute of Technology  
Room 3-174  
77 Massachusetts Avenue  
Cambridge 39, Massachusetts

Dear Dr. Stever

1. You are invited to confer with personnel of PROJECT FORECAST on 24 September 1963 at Space Systems Division, Inglewood, California.
2. In accordance with the provisions of your current travel orders you are authorized to proceed from the above address to Inglewood, California and return with variations in itinerary as may be necessary.

Sincerely

  
JULIUS H. MASSEY, JR.  
Lt Colonel, USAF  
Assistant Secretary  
USAF Scientific Advisory Board



FORECAST STATUS BRIEFING TO VISITORS

World is for me

23 September 1963

AGENDA

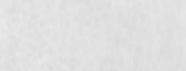
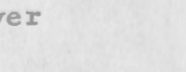
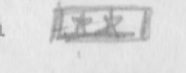
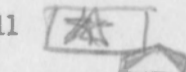
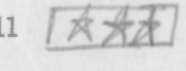
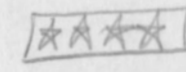
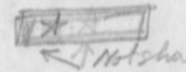
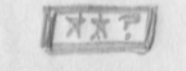
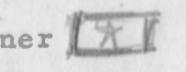
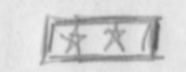
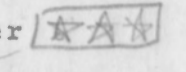


Presented by  
Sears  
Rothman

TIME	Info	SUBJECT	SPEAKER
0800 - 0830		Introduction	Gen Schriever
0830 - 0930	Hi	Policy	Gen Page
0930 - 0945	Hi	Overview of Technology	Mr Donovan
0945 - 1005	Hi	Materials	Col Standifer
		Break (10 Minutes)	
1015 - 1035	Hi	Propulsion	Col Silk
1035 - 1105	Low	Flight Dynamics	Col Marschner
1105 - 1130	Med	Guidance	Col Duffy
1130 - 1145	Med	Computer Technology	Dr Ware
1145 - 1200	Hi	Technology Summary	Mr Donovan
Real Technological Breakthroughs improve all war capabilities			
LUNCH			
1300 - 1400	Hi	Limited War	Gen Saville
1400 - 1415	Hi	Transport Aircraft	Gen Maxwell
1415 - 1425	Low	Command & Control	Gen Maxwell
1425 - 1510	Low	General War	Gen Whisenand
		Break (10 Minutes)	
1520 - 1550	Low	Continental Defense	Dr Puckett
1550 - 1605	Med	Space	Mr Donovan
1605 - 1635		<del>Operations Analysis Considerations</del>	<del>Col Lalojian</del>
1635 - 1700		Summary	Gen Schriever
1700 - 1800		Intelligence & Reconnaissance	Gen Ritland

AICOM  
AMPS  
MPLA  
MPHE  
OSF  
NOSS

Too expensive





4/15/63

See: classified file



fm

FEB 14 1964

14 Feb.

Dr. Steven.

This is the latest version of Gen. Schriever  
final report - He has indicated this looks  
very much like the version he will go  
with - He would like you to read it  
and later we will contact you for your  
reaction. The technology section is being  
reworked by Al Donovan. They are trying  
to reduce it from 120 pages to about 50-60  
pages. Also the decision as to whether to  
submit the technology section as a part of  
the report or as an annex is still  
under consideration - Your comments will  
be appreciated - Hope you caught the  
six P.M. shuttle on 5 Feb -

Many thanks.

John E. ...  
At 6:15



Gen. Schriever did not say just when he would get in touch with you, but will probably be early next week.

noted file

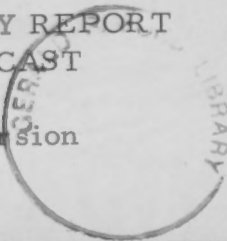
Jim Bradley



DIRECTOR'S SUMMARY REPORT  
PROJECT FORECAST

12 February Version

FEB 14 1964



## INTRODUCTION AND SUMMARY



### Introduction

Science and technology are the root strength of our Nation's military security. They will continue to be in the decade ahead. The pace of scientific and technological advance has not slackened, nor will the acquisition of new knowledge be limited to any artificial plateau.

Soviet leaders have made it clear that they intend to surpass the United States in all areas, but particularly in science and technology. Soviet achievements in nuclear energy, ballistic missiles, and in space demonstrate that their intentions are founded on impressive accomplishments. This Soviet potential must be considered as a stark reality. If the United States is to deal realistically with this challenge and potential, it is vital that we regard science and technology as an ever-expanding resource to be tapped continuously for implementing national policy rather than arrested in the hope that a similar technological pause would occur in the Soviet Union.

A decision to pursue and exploit the technological potentials of the decade ahead will provide the Air Force with the urgently needed diversity of military capabilities required to maintain the Nation's security and fulfill its fundamental policy goals.

### Progress in Technology

A projection of research and development into the next decade shows that substantial gains are already in the offing. Although not characterized



INTRODUCTION AND SUMMARY

Introduction

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Handwritten notes and calculations:

4.5	
8.7	
4.0	
17.2	5.7

A decision to pursue and exploit the technological potentials of the decade ahead will provide the Air Force with the urgently needed diversity of military capabilities required to maintain the Nation's security and fulfill its fundamental policy goals.

Progress in Technology

A projection of research and development into the next decade shows that substantial gains are already in the offing. Although not characterized

by the term "technological breakthrough", these gains can, if exploited, be translated into significantly new and different weapon systems.



Technological opportunities exist in the fields of materials, propulsion, aerodynamics, guidance, nuclear and non-nuclear weapon design. In materials, high-strength boron filaments, together with improved plastic binders may make available structural materials whose advantages over aluminum represent a bigger increment of gain than the total achieved in the previous 3000 years. Oxide-dispersion hardened alloys will permit raising turbine engine operating temperatures to a degree sufficient to double the thrust per unit weight of engines for high speed aircraft. In propulsion, these advances in materials will make feasible VTOL engines generating eight times as much thrust per unit weight as today's engines. More advanced hydrogen propulsion units such as the cryojet will make feasible supersonic type aircraft flying at Mach 6, with gross weights perhaps 100,000 lbs less than present designs, for ranges in the order of 5,000 miles. In aerodynamics, laminar flow control will reduce drag and may extend aircraft ranges by as much as 50%. In guidance, operational ICBM CEP's can be reduced to about 0.1 nautical miles. This should have a major impact on the survivability of the enemy's hardened missile forces. Air-to-surface "hitting missiles" appear possible, with CEP's of the order of 10 feet. In nuclear weapons design, clean warheads having controlled and enhanced effects, can be

?

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Yes

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developed; in non-nuclear weapons design, advanced fragmentation weapons and techniques for effective delivery of incapacitating agents are possible.

Certain of these expected gains will greatly enhance our future ability to conduct efficient and highly discriminate operations with both non-nuclear and nuclear weapons. With such capabilities the Air Force's future role in conflicts below the intensity of an all-out thermonuclear exchange will assume far more meaning and credibility than present and programmed forces can provide.

#### Weapon Systems and Advanced Technology



Based on the advances outlined above, FORECAST's principal recommendations are for the technical preparation which can lead to five new weapon systems for the Air Force. They are: (1) An advanced manned precision strike aircraft (AMPSS), which would provide a flexible and controlled capability in the limited-to-general warfare spectrum; (2) a highly accurate, variable-yield nuclear warhead air-to-surface missile, to enhance the survivability of manned delivery systems and to increase the flexibility of force application; (3) a large cargo logistics aircraft, to provide global mobility to U.S. military forces; (4) a VTOL light transport for intra-theater operations; and (5) a limited war VTOL strike-reconnaissance aircraft to provide close support to ground forces.

In addition, there are other important areas of advanced technology which should be given added emphasis. Some of these are: (1) Advanced

ICBM with 0.1 nautical miles CEP; (2) a mobile air defense; (3) a manned orbital laboratory; (4) a reusable booster; and (5) a hypersonic (Mach 6) aircraft.

#### Bases of Principal Recommendations

These principal recommendations of FORECAST result from an assessment of the impact of science and technology on the future role of the Air Force and from a consideration of present National policies for dealing with the threat to our National security. By directing effort toward those technical areas that have the greatest potential, the Air Force can provide policy makers with capabilities for dealing effectively with any contingency within the entire spectrum of conflict. Extensive cost analysis reveals that these actions are realistic from a budgetary standpoint. Adjustments in technical programs are now under way to set the proper course for these advances, within existing resources.





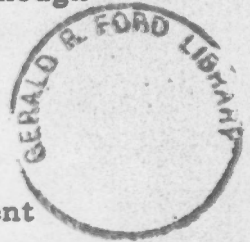
## THE THREAT TO UNITED STATES SECURITY

It is impossible to project a single most probable set of world conditions into the 1970s. Influencing factors are so unpredictable that a virtually unlimited number of different situations are possible.

FORECAST projections are aimed at dealing with the most likely and most difficult of possible future situations. These projections, although a FORECAST interpretation, are based on inputs from appropriate agencies.

The dominant feature of the future national security environment over the next decade will be a continuous confrontation between communism and the Free World, with the Soviet Union and the United States as the strongest military powers. The Soviet Union and Communist China while at present engaged in an ideological debate have some common objectives, chiefly a reduction of the position and power of the United States. The Communists will exploit every opportunity for aggressive action, whether this opportunity is the result of natural forces at work in the world or a product of subversion. In the over-all communist threat, the military element presents the greatest danger to the survival of the United States.

The United States must face the possibility of a general Soviet nuclear attack on American cities and industrial centers. However, it is believed that short of an unpredictable technological breakthrough the Soviets will be



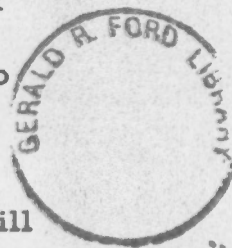
unwilling to risk such an attack.

Although the Soviets may be short of over-all U.S. power, their possession of a high level of strategic power, or their acquisition of an anti-missile defense capability, could give them the confidence to initiate limited military actions.

In both limited war and insurgency situations the communists will probably continue to rely primarily on indigenous forces. Areas are numerous where they may be able to stimulate and supply a conflict of low-level violence, closely related to a political effort, and the United States could become involved in several such areas simultaneously.

During the next decade the United States must also be prepared to engage in some conflicts caused by neither of the two major communist powers--the Soviet Union and Red China. To deal with such conflicts, the United States will have an increased need for flexibility in the choice of military options.

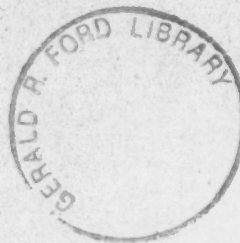
There will be other problems in the maintenance of American security, some of them related to the trend away from the bi-polar world, exhibited by the Sino-Soviet split. Conversely, the task of holding together the Atlantic Alliance is becoming increasingly difficult and some foresee the development of Europe as a separate western concentration of power. The proliferation of nations possessing nuclear weapons will pose problems to the United States (as well as to the Soviet Union) and add to the types of conflicts for which the United States must prepare.



The diffusion of power and influence throughout the world, evident in its diminishing bi-polarity, is also seen in the rise of many new states amid conditions which lead to ineffective, but highly nationalistic, governments. At the same time, the drive of their peoples for economic and social improvement may result in increased opportunities for the expansion of communism or increased tensions with the United States. This diffusion and shifting of political power, and the resultant threats to world stability, will greatly complicate the future tasks of the Air Force.

#### Soviet Technology

The expanding Soviet technology may well have the most significant implication for the decade ahead. The U. S. S. R. has made large investments in technology; from 1955 to 1960 the number of Russian scientists and engineers engaged in research and development doubled, and the number of scientific institutions increased by fifty percent. Rapid strides have been made in nuclear technology, in the development of advanced aircraft and missile systems, and in space. The pace of development in these fields forces the assessment that the Soviets may achieve military superiority through technological means.



## MILITARY POLICY GOALS

National policy was a basic consideration in the FORECAST evaluation of future Air Force programs and requirements. Its implications for our future military establishments are paramount. The basic objective of FORECAST was to orient USAF technical programs toward mission capabilities best suited to meet the military policy goals of the United States.

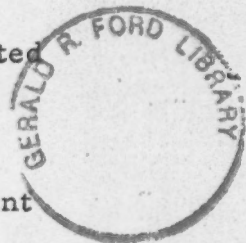
With the assistance of appropriate Defense and State Department officials, Project FORECAST developed an interpretation of the nation's fundamental military policy goals.\*

### Levels of Warfare

General war, according to the Joint Chiefs of Staff definition, is armed conflict between the major powers of the communist and free worlds in which the total resources of the belligerents are employed and their national survival is in jeopardy. It could start-- and end-- below the level of total war (holocaust), depending upon our war-fighting capability and the ability to communicate our intentions to the enemy. This latter factor is extremely important if controlled response and escalation are to be meaningful in a general war situation.

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\*The scope of these goals is covered in the following items: (1) Effective deterrence of war at all levels of intensity; (2) Ability to manage crises; (3) Adaptability to realistic arms control measures; (4) Survivability to weapon systems and forces; (5) Provision of multiple options throughout the intensity spectrum of warfare, so that the national leadership will have the desired flexibility in crisis management; (6) Capability of responding in a carefully controlled and decisive manner; (7) Ability to limit collateral damage both to the enemy and ourselves, including our allies; (8) Provision of a maximum number of negotiating thresholds throughout the intensity spectrum of warfare; (9) Ready adaptability to war termination policies.

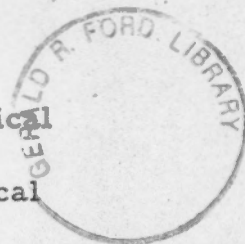


There is a widespread tendency to think about nuclear war and non-nuclear war in radically different terms. Many regard even low-level nuclear conflict as inevitably developing into thermonuclear holocaust. Public discussion has contributed greatly to this image of catastrophe. There is at present general acceptance of the so-called "firebreak"--between nuclear and non-nuclear operations--as a recognizable qualitative distinction in weapon types that does not exist so clearly anywhere else along the intensity range of warfare.

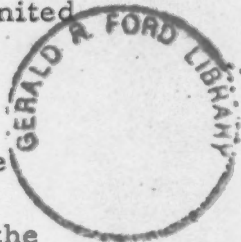
Advances in nuclear technology have greatly reduced the physical gap between the largest non-nuclear weapon and the smallest tactical nuclear weapon. The latter is now only of the order of 100 times more powerful and future developments can effectively eliminate this gap. However, a psychological barrier, represented by a genuine reluctance on the part of the United States to be the first to initiate the use of tactical nuclear weapons, still exists.

It is generally accepted, as war games indicate, that for the foreseeable future both the United States and the U. S. S. R. will have the ability to wreak great devastation on each other regardless of which side preempts. So long as this situation prevails it remains in the self-interest of both sides to avoid an all-out "city busting" or countervalue exchange.

While mutual deterrence is considered to be developing at the countervalue level, this does not mean that one side or the other cannot attain



decisive military advantage by attacks at various levels below that of holocaust. It is therefore essential that the nation's military forces be able to carry out measures appropriate to challenges which may arise. We must have the ability to conduct counterforce operations, i. e., military force against military force. This ability will enable the United States to use escalation as a tool, to tell the enemy that the level of conflict will be raised to whatever intensity is required to exceed the calculated risks the enemy might contemplate. Without this ability the enemy can create negotiating thresholds on his own terms. Future weapon systems must be able to demonstrate that a counterforce strategy is being employed, that pointless devastation is not the aim, and that a deliberately planned threshold of conflict is being attempted.



In summarizing our military policy goals we see that there are certain major and unique requirements which must be met if these goals are to be fulfilled.

So long as the thermonuclear impasse exists, Limited War and Counterinsurgency will remain the most probable types of conflicts. To cope with these situations, the need to achieve positive control systems will become increasingly more acute, as efforts are made to develop new weapon systems which can implement a controlled response doctrine. It would be foolish to attempt to minimize the risks involved in conflicts where nuclear weapons are called for. However, the choice may not be ours and it becomes mandatory to have the tools in hand which can place these risks in proper perspective.

## MILITARY CAPABILITIES

FORECAST has attempted to determine future Air Force capabilities on the basis of the interaction between operational tasks and national military policy objectives. These required capabilities in turn form the basis of the importance and direction of research and development programs which must be pursued.

As discussed previously, the most pressing needs relating to future capabilities is in that band of the conflict spectrum below thermonuclear holocaust. Toward this end, new and different military capabilities are necessary to provide the effective and discriminate application of force to conflicts ranging in intensity from counter-insurgency, through Limited War and into the higher levels of General War.

To become truly meaningful, the doctrine of controlled response, which embraces the warfare intensity range below holocaust, must be backed up by weapon systems which can be operated under the most stringent measures of positive control. This degree of control must extend clear through the operational sequence and will require:

(1) Positive identification of the target during the terminal phase of delivery; (2) absolute command and control to the point of warhead detonation; and (3) extremely accurate delivery to ensure a highly discriminating mode of attack, whose nature can be unequivocally understood by the enemy. The greatest opportunity of achieving these



conditions lies in having a man, with the necessary technical aids, at the target.

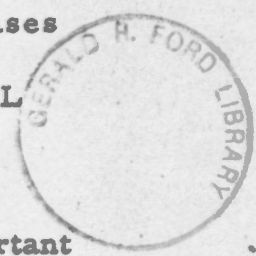
The combination of unguided weapon delivery and the effects from current tactical (fission) warheads do not permit a high measure of military effectiveness to be achieved without an excessive level of collateral damage resulting. To conduct nuclear attacks in a highly discriminate manner, which clearly indicates that only counterforce goals are being pursued, calls for a missile delivery system, incorporating nuclear warheads which are designed toward minimizing collateral effects.

The uncertain political future does not allow responsible planning to be made regarding the nature of an overseas basing structure which might exist in the years ahead. Prudent planning must call for the design of systems which can be deployed and operated independently of an unpredictable base system. Clearly this requirement calls for a global air mobility which will permit the deployment and support of ground forces, in accordance with our world-wide commitments.

Whether future limited wars are fought with nuclear or non-nuclear weapons, the threat that the employment of nuclear weapons holds to the vulnerability of forces which operate from fixed bases cannot be dismissed. Weapon system requirements must be predicated on the possibility of nuclear warfare and, accordingly, survivability on the ground



must be a key design parameter. The greatest measure of survivability can be achieved by maximizing the number of targets presented to the enemy. This is best accomplished by the elimination of fixed bases and providing our aircraft, both logistics and combat, with VTOL capabilities.



These aforementioned capabilities represent the most important needs to be considered in the attempt to direct technology toward the implementation of our national policy goals.

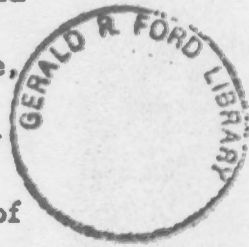
In line with these needs just described, Project FORECAST has selected those capability areas believed most critical and has restricted its proposals to those systems which will allow the Air Force to contribute most effectively to the future military posture of the country. Five new weapon system capabilities for the Air Force fall in this category. They are: (1) an advanced manned precision strike aircraft, (2) a highly accurate variable yield nuclear air-to-surface missile, (3) a large cargo logistics aircraft, (4) a VTOL light (3-4 ton) transport, and (5) a limited war/COIN VTOL strike-reconnaissance aircraft.

In addition, FORECAST proposes a number of other areas in which improved capabilities should be given emphasis through study, analysis and R&D programs. Some of them are: (1) ICBM 0.1 nautical mile CEP, (2) a mobile air defense system, (3) a manned orbital laboratory, (4) a recoverable space booster, and (5) a hypersonic (Mach 6) aircraft for reconnaissance.

Intensively considered, but not covered here because of security considerations, were those areas pertaining to reconnaissance and intelligence. As has always been the case considerable improvements in these areas are to be sought and the technological promise appears great.

Finally, in consonance with reconnaissance and intelligence improvements, is the requirement for survivable and reliable command and control facilities capable of translating the products of intelligence, detection, surveillance and warning into meaningful and ultimately decisive military actions. The correlation of enormous amounts of information needed for effective command and control demands special attention. Advances in computer design now permit new programming techniques. The development of software computer techniques, to enable military personnel to alter information data bases and display of information to meet unique requirements without the need of professional programming, would prove a substantial advance in this area. The trend toward airborne or spaceborne command and control should be accelerated.

The technologies which have been emphasized here can enable the Air Force to achieve marked progress toward supporting our policy goals in the decade ahead. Two to three years of intensive technological advance and preparation, accompanied by careful tradeoff analyses and



preliminary designs of systems is the wise and prudent approach.

A vigorous research, exploratory and advanced development program supported by study, analysis and experimental data gathering should be undertaken. Such a course of action will provide the maximum in enhanced capability for the least cost in resources.



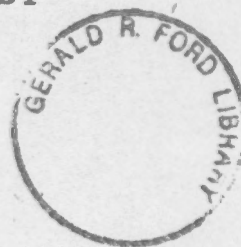
## COSTS

In projecting USAF forces for the 1970 time period, FORECAST recognized that a compilation of all foreseeable capabilities would result in resource requirements clearly unattainable within the budgetary levels which the Air Force could reasonably anticipate.

Thus, it was apparent that alternative policies, strategies, and weapon systems approaches should be systematically examined in terms of cost. To this end, resource requirements were developed as completely and accurately as possible for each of the alternatives considered.

Sensitivity analyses were conducted to determine the way in which total system costs would be effected by variations in key design parameters. These analyses served to highlight the decision areas where cost impact was likely to be most critical. Through these analyses, the study panels were provided with hardware costs per se, and also had available the entire cost picture, including the resource-demanding factors that enter into the operational environment of specific systems, i. e., installations, personal maintenance, and related considerations. The results of this cost estimating work were applied to the proposed systems and made available as a continuing part of the analyses throughout the entire study period.

As a result of this continuing cost analysis, there was acute awareness of the need for consideration of total resource impacts resulting from the system proposals. Consequently, the unrealistic demands that frequently



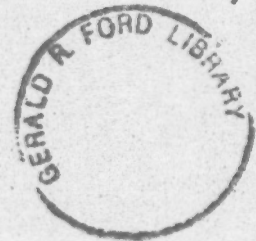
emerge from broad scaled study efforts do not appear in this one. On the contrary, the funding required to support the foregoing proposals, when projected into the early 1970 time period, will not increase any single future year's budget over the annual level which the Air Force has received in recent years.

Thus for the 1964 and 1965 fiscal year budget, currently available R&D resources are being reoriented to bring existing technological programs in line with FORECAST's priority proposals.



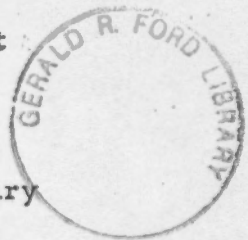
(Personnel)

The human element will continue to be the most significant single factor in developing and maintaining the effectiveness of USAF command and weapon systems. Since the pattern of human performance required to carry out the Air Force mission will be changing as we move into the 1970s, there must be periodic critical re-evaluations of personnel policies. The translation of technological opportunities into military hardware will require that the Air Force have a professional capability to manage the development and acquisition of systems. It must attract and retain highly skilled technical personnel. In particular, the retention of senior officers, who manage scientific and engineering programs, must be effected. This can be done through an enlightened personnel policy which envisages a military classification system responsive to military specialty requirements, and a pay-scale which is commensurate with the competence and great responsibilities which are entailed. This problem cannot be considered unilaterally by the Air Force, but must be given full consideration by the leadership of the Department of Defense.



(? to be added at end of report ?)

As stated at the outset of this report, science and technology are the root strength of our Nation's military security, and they will continue to be in the decade ahead. Throughout the report, first emphasis has necessarily been given to the importance of exploiting the continuing potentials of science and technology in the interest of national security. There is, however, a significant inter-relationship between technology, as exploited for the truly primary cause of national security, and the benefits that accrue through concurrent or later applications of these technologies in the industry and economy of the nation. For example, recent American advances in commercial aviation, in particular the advent of jet commercial aircraft, are in large measure the result of technology derived from military development programs established to provide Air Force manned aircraft requirements.



The relationship between technical advances derived from research and development effort on defense projects and the application of these advances to our national technological and industrial growth is in some instances one of significant interaction. Our world-wide competitive position (again, jet long-range, commercial transports are a striking instance) is in part related to technological contributions that have

originated primarily in response to national security requirements.

In the course of its studies, FORECAST has identified areas of research and technology--of which the radically significant potentials of boron are a notable example--that give the highest promise of producing major improvements in military systems performance. Research and development programs in the several areas which Project FORECAST, has examined and highlighted as basic national security requirement could, additionally, have significant bearing on the nation's industrial growth and world-wide competitive position.

