

Mission Support Products Engineering

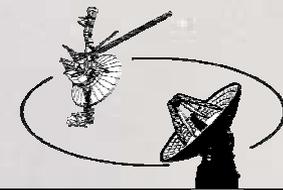
Resource Analysis Team



ITT Industries

**Earnestine Hampton
Art Andujo**

August 23, 2004

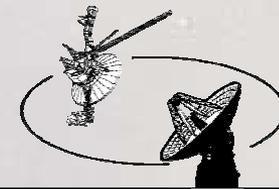


RAPSO Organization and Processes

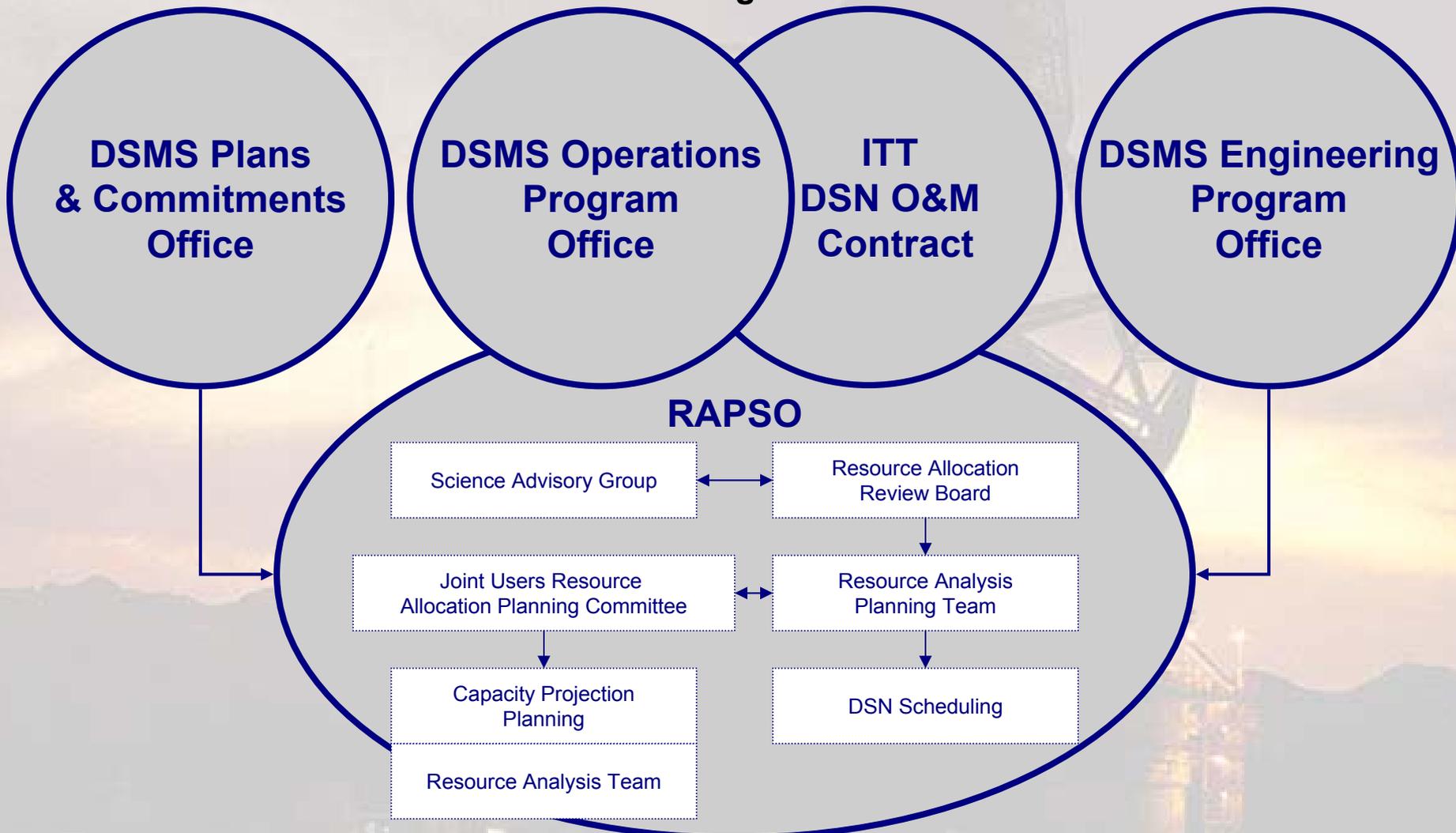




Mission Support Products Engineering

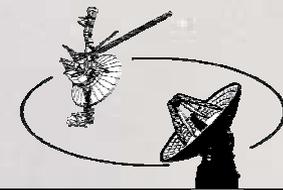


RAPSO Organization





Mission Support Products Engineering



RAPSO Responsibility

RAPSO is responsible for managing the process that:

- Interface with NASA Headquarters and Project Management on spacecraft tracking requirements and commitments.
- Plans and schedules the assignment of the Deep Space Network (DSN) ground data systems in support of customer programs and projects.
- Conducts conflict resolution reviews and meetings.
- Performs DSN impact analyses and special studies.
- Maintains and disseminates the official JPL Mission Sets.
- Produces periodic plans, forecasts, and detailed schedules for DSN operational support.
- Develops and maintains the associated software tools and databases.

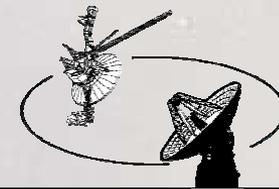


ITT Industries

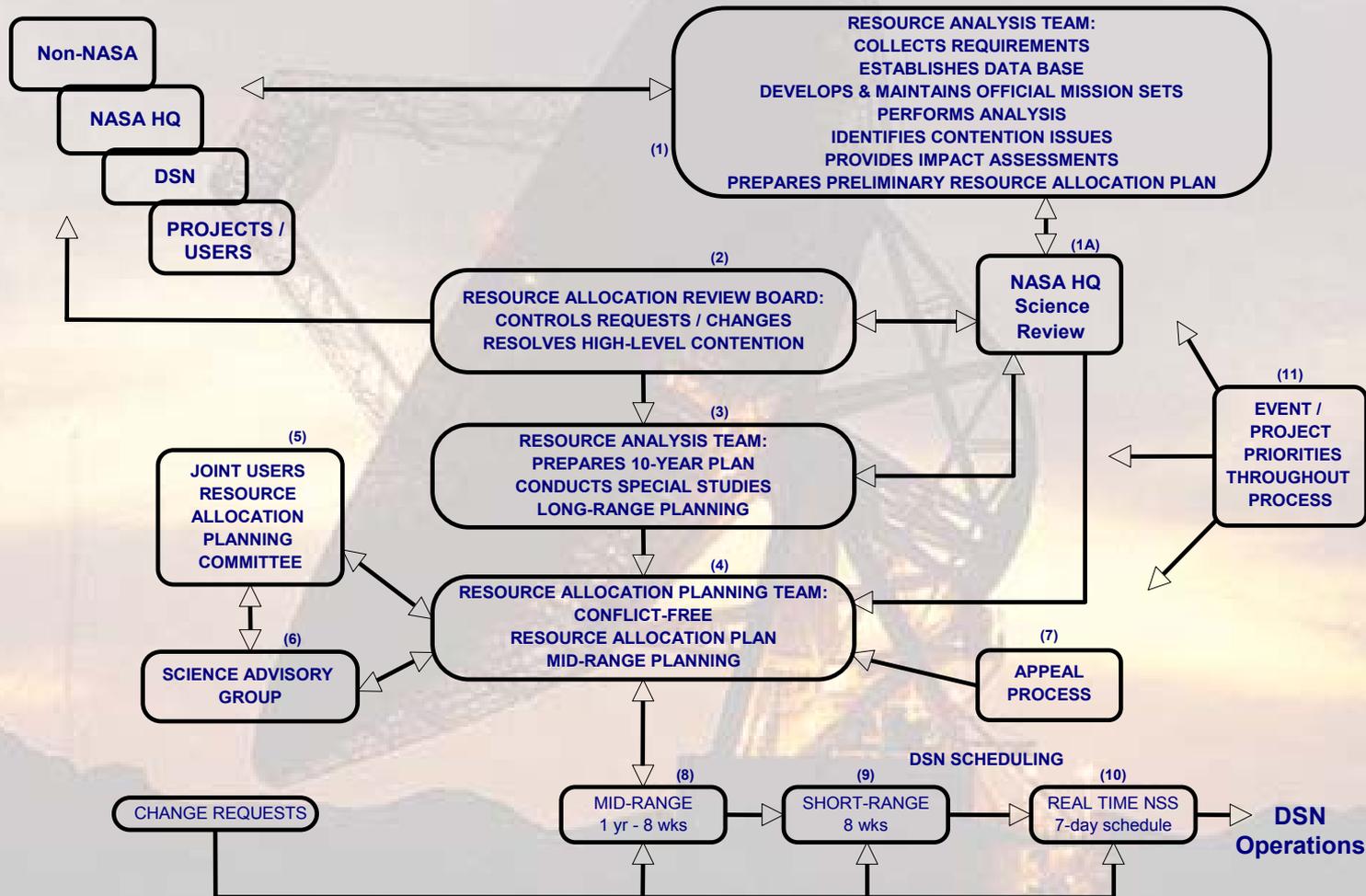
Deep Space Network Operations & Maintenance



Mission Support Products Engineering



RAPSO Process

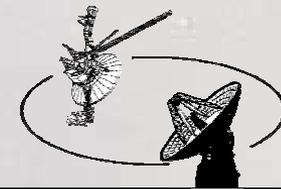


ITT Industries

Deep Space Network Operations & Maintenance



Mission Support Products Engineering



RAPSO Process

(1) & (3) Resource Analysis Team

- Deep Space Mission Service Agreement (DSA) Analysis
- Special Studies & Impact Assessments
- DSN Resource Allocation Plans

(1A) NASA Headquarters Science Review

- Meets before the Resource Allocation Review Board (RARB)
- Provides science mission priorities, if needed, for use in resolving resource contentions
- Provide RAPSO disposition of official DSN Mission Set

(2) Resource Allocation Review Board (RARB)

- Held in February and August, to resolve 26m / 34m / 70m contention.
- Update DSN users current requirements.
- Participation by all affected Project Managers and Project Scientists, or their representatives.

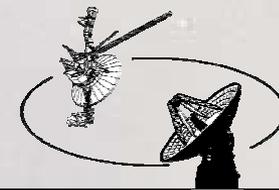


ITT Industries

Deep Space Network Operations & Maintenance



Mission Support Products Engineering



RAPSO Process

(4) Resource Allocation Planning Team (RAPT)

- Meets every other weeks
- Project and DSN scheduling representatives
- Produces conflict-free plan by consensus
- Appeal process is available, if necessary

(5) Joint User Resource Allocation Planning (JURAP) Committee

- Meets monthly
- Project Mission Operations Managers and DSN Operations Manager
- RARB Action Item follow-up and discussion
- Identify new or changed requirements and conflicts post-RARB
- Interim RARB, establishing priorities
- Conflict resolution for Mid-Range and Short-Range Scheduling purposes



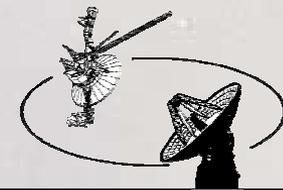
ITT Industries

Deep Space Network Operations & Maintenance



JPL

Mission Support Products Engineering



RAPSO Process

(6) Science Advisory Group

- A standing group, activated and chaired by Dr. E. J. Smith,
- RAP Science Advisor, to address conflicts involving science data requirements or specific science events

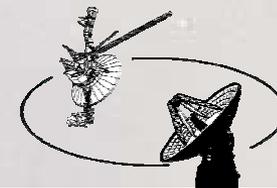


ITT Industries

Deep Space Network Operations & Maintenance



Mission Support Products Engineering



RAPSO Process

(7) Appeal Process:

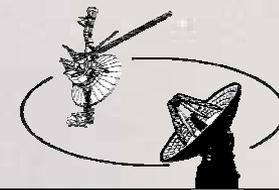


ITT Industries

Deep Space Network Operations & Maintenance



Mission Support Products Engineering



RAPSO Process

(8) Mid-Range: 1 year - 8 weeks

- "RAP Book" on RAP server, for User evaluation
- Updated at 2 – 3 days intervals
- Contains requested DSN activity
- Identifies conflicts
- Used by RAPSO to negotiate Short-Range Plan

(9) Short-Range: 8 weeks

- Conflict-free
- Four schedule weeks are released to DSN scheduling electronically every 4 weeks

(10) Real Time Network Support Subsystem (NSS): 7-day schedule

- Changed as required
- Executed by Ops Chief

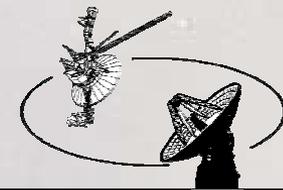


ITT Industries

Deep Space Network Operations & Maintenance



Mission Support Products Engineering



RAPSO Process

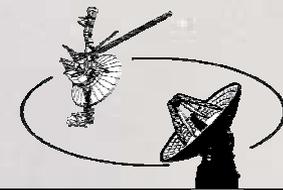
(11) Event Priorities:

PRIORITY	ACTIVITY PERIOD & PRIORITY CRITERIA	EXAMPLES
1	Spacecraft emergency	Determined in real time
2	Mandatory for achievement of primary objectives. Support essential to spacecraft survival.	Periodic uplink to reset critical systems; launch; planetary orbit insertion; some TCMs*
3	Major, unique, scientific event. Time-critical.	Planetary encounter; major unforeseen scientific events (e.g., CME, supernova).
4	Minimum DSS maintenance, minimum support to maintain science validity.	Critical maintenance; short spans of data acquisition to assure data continuity.
5	Mandatory for achievement of primary objectives. Not time-critical.	Some TCMs*; includes spacecraft health and condition monitoring, and planetary astronomy.
6	Time-critical events not essential to primary mission objectives.	Includes radio astronomy.
7	Repeated scientific opportunities. Not time-critical.	Improvement upon minimum science return; includes host country radio sciences.

Trajectory Correction Maneuvers (TCMs) are considered to fall into two categories: (1) TCMs that are constrained to a particular time may be considered Priority 2, e.g., injection into planetary orbit; (2) TCMs that offer more flexibility in planning are considered Priority 5. The Projects are expected to make every effort to avoid conflicts by coordinating their plans with the other users.



ITT Industries

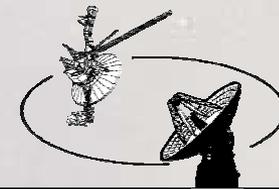


Current Software Tools and Databases

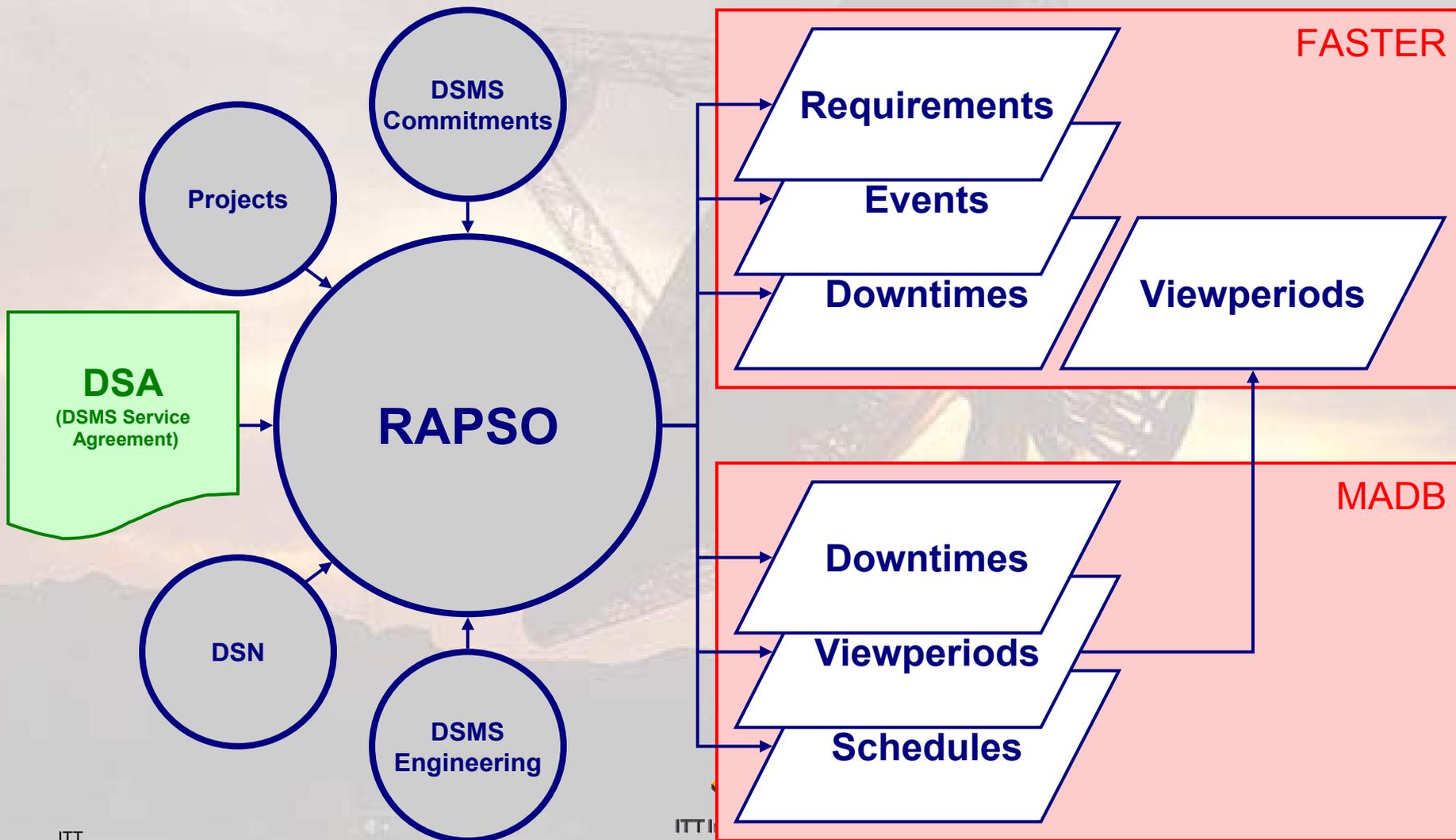




Mission Support Products Engineering

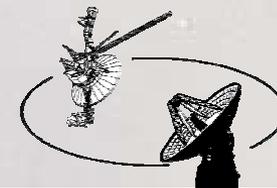


Databases

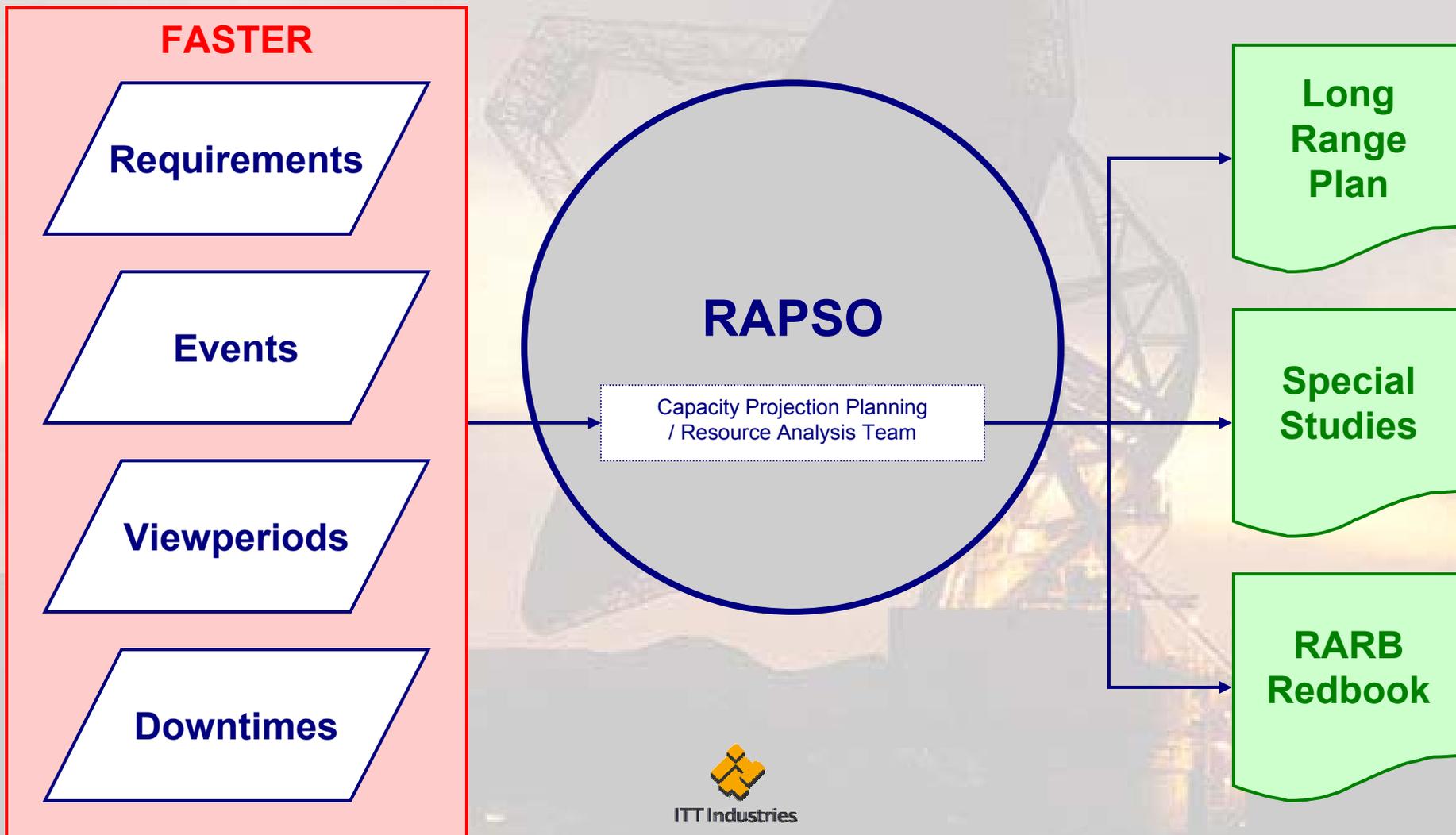




Mission Support Products Engineering

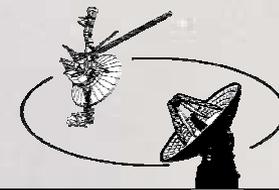


FASTER for Analysis

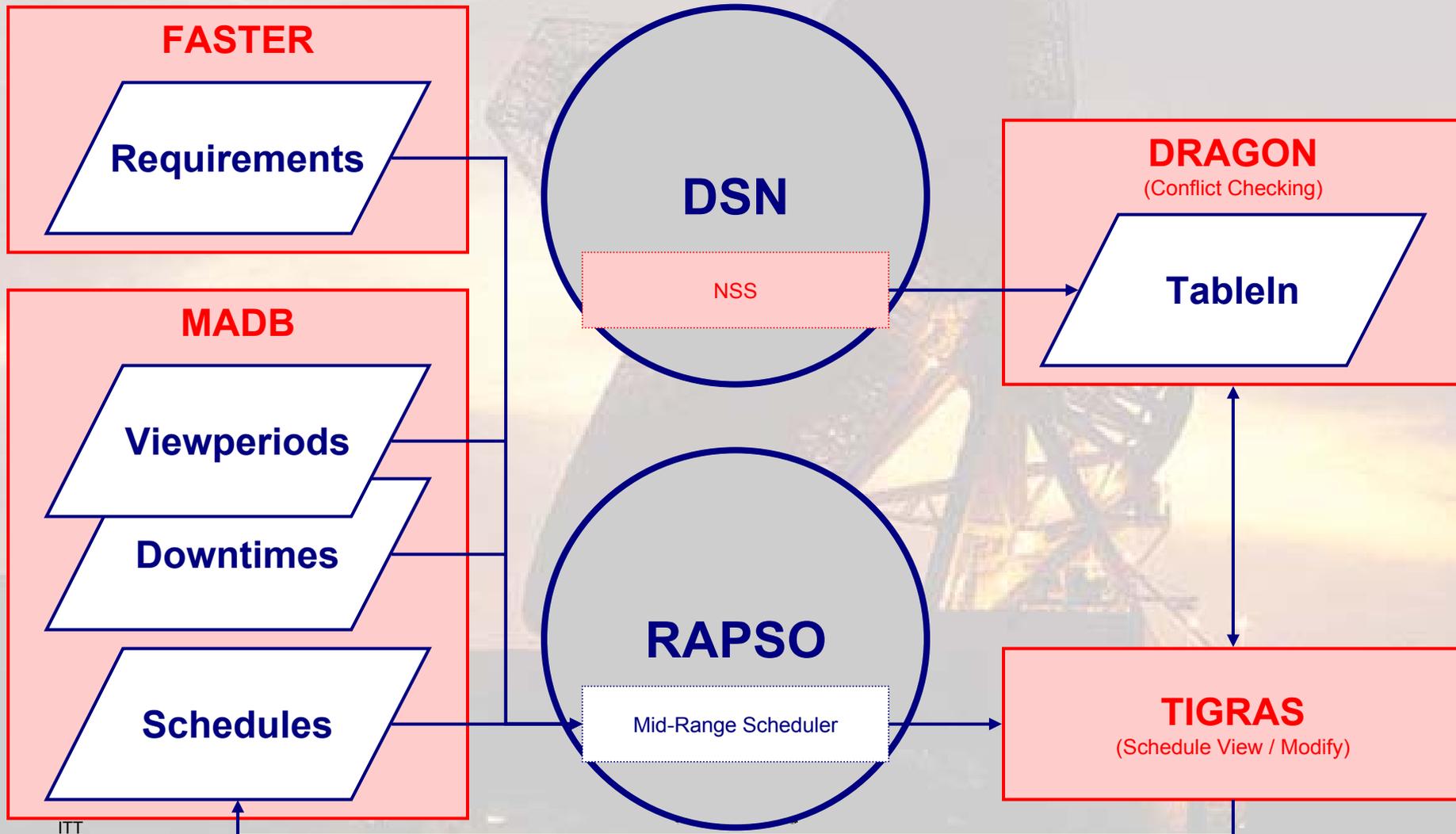




Mission Support Products Engineering

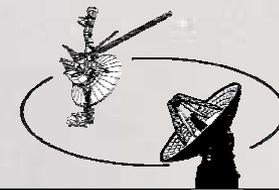


MADB / TIGRAS / DRAGON for Mid-Range Scheduling

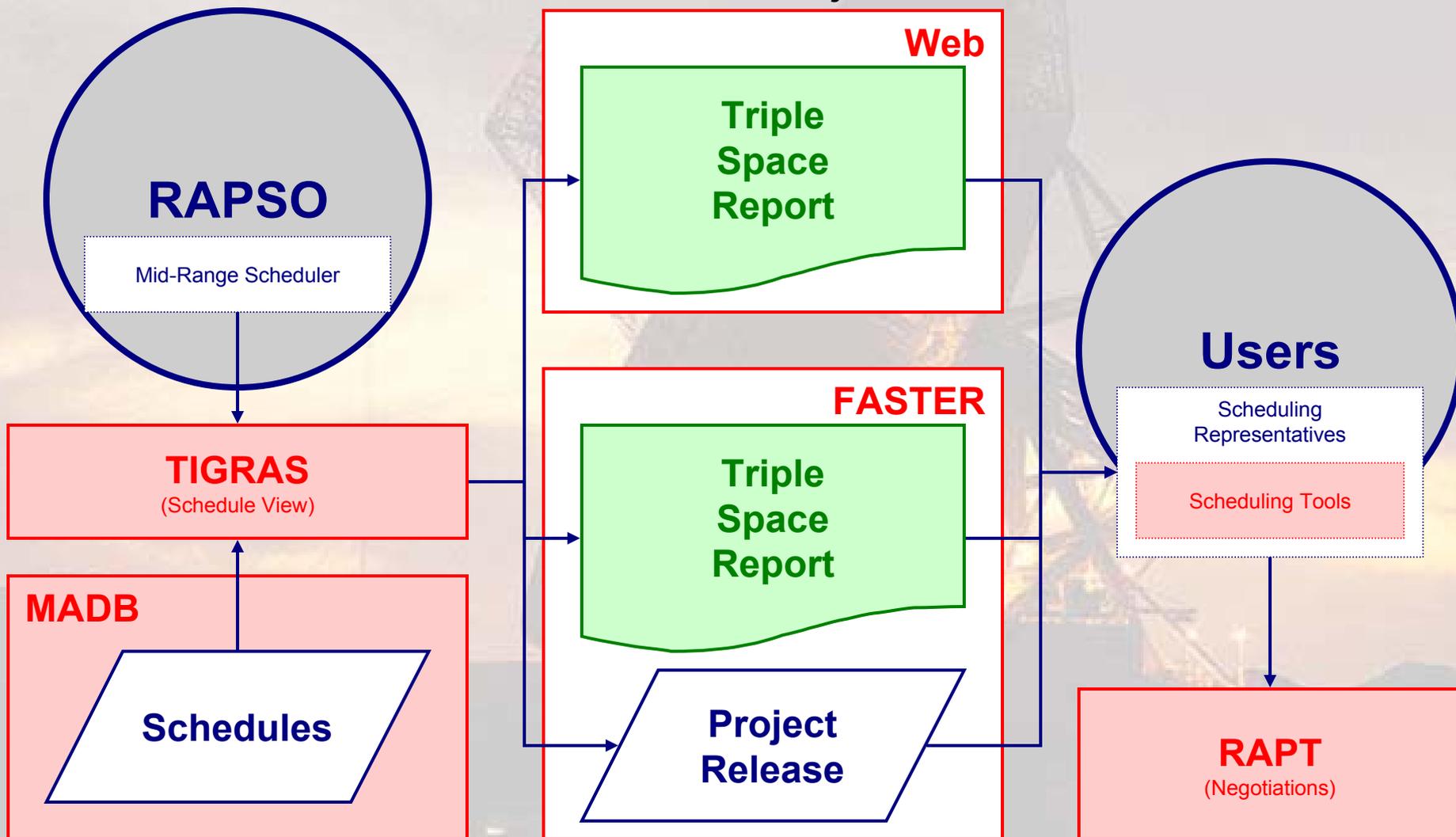




Mission Support Products Engineering

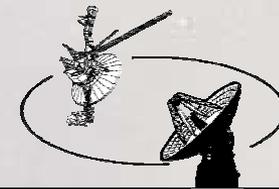


Schedule Release to Projects / Users

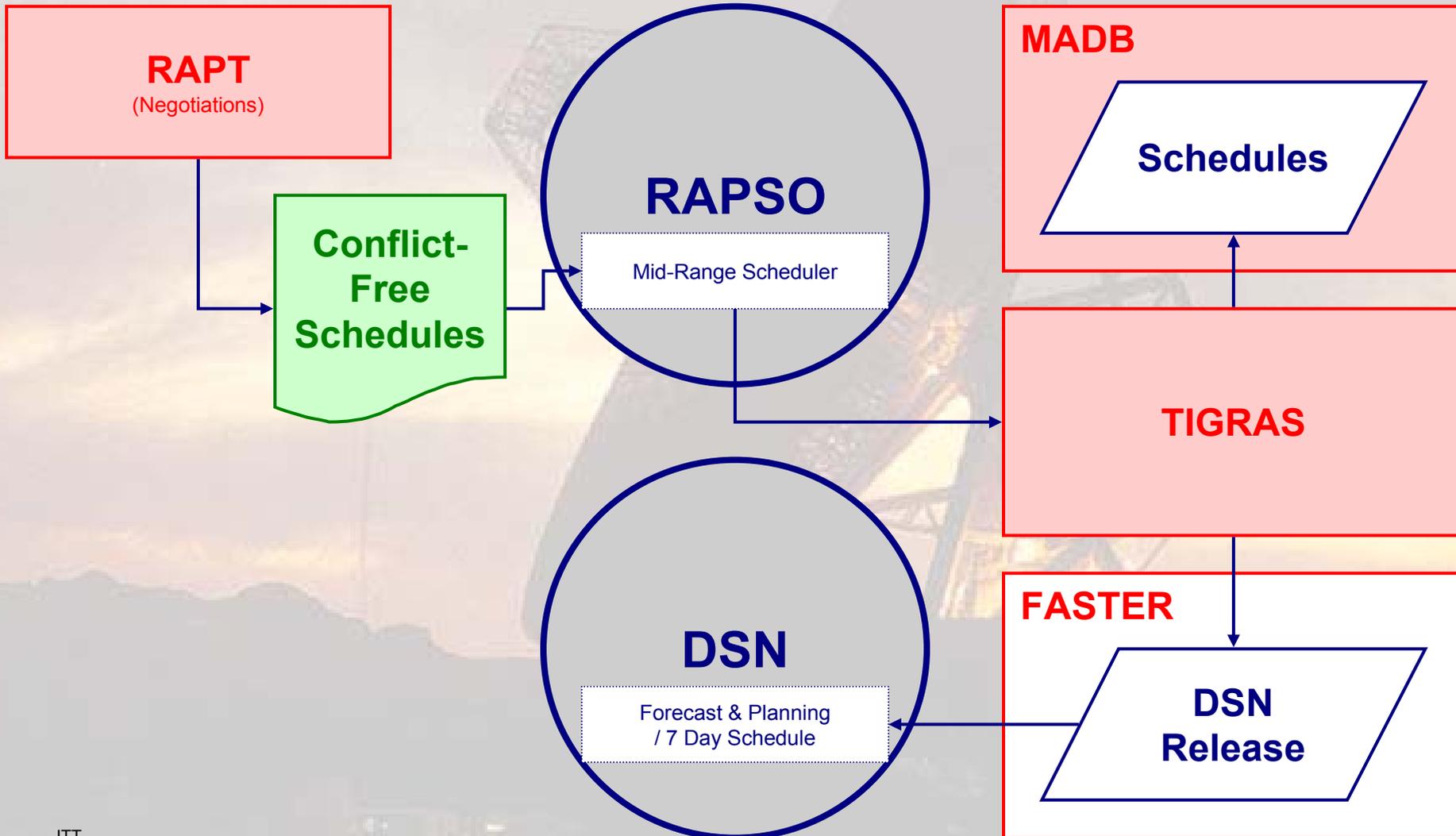




Mission Support Products Engineering

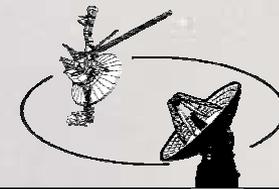


Schedule Release to DSN Scheduling

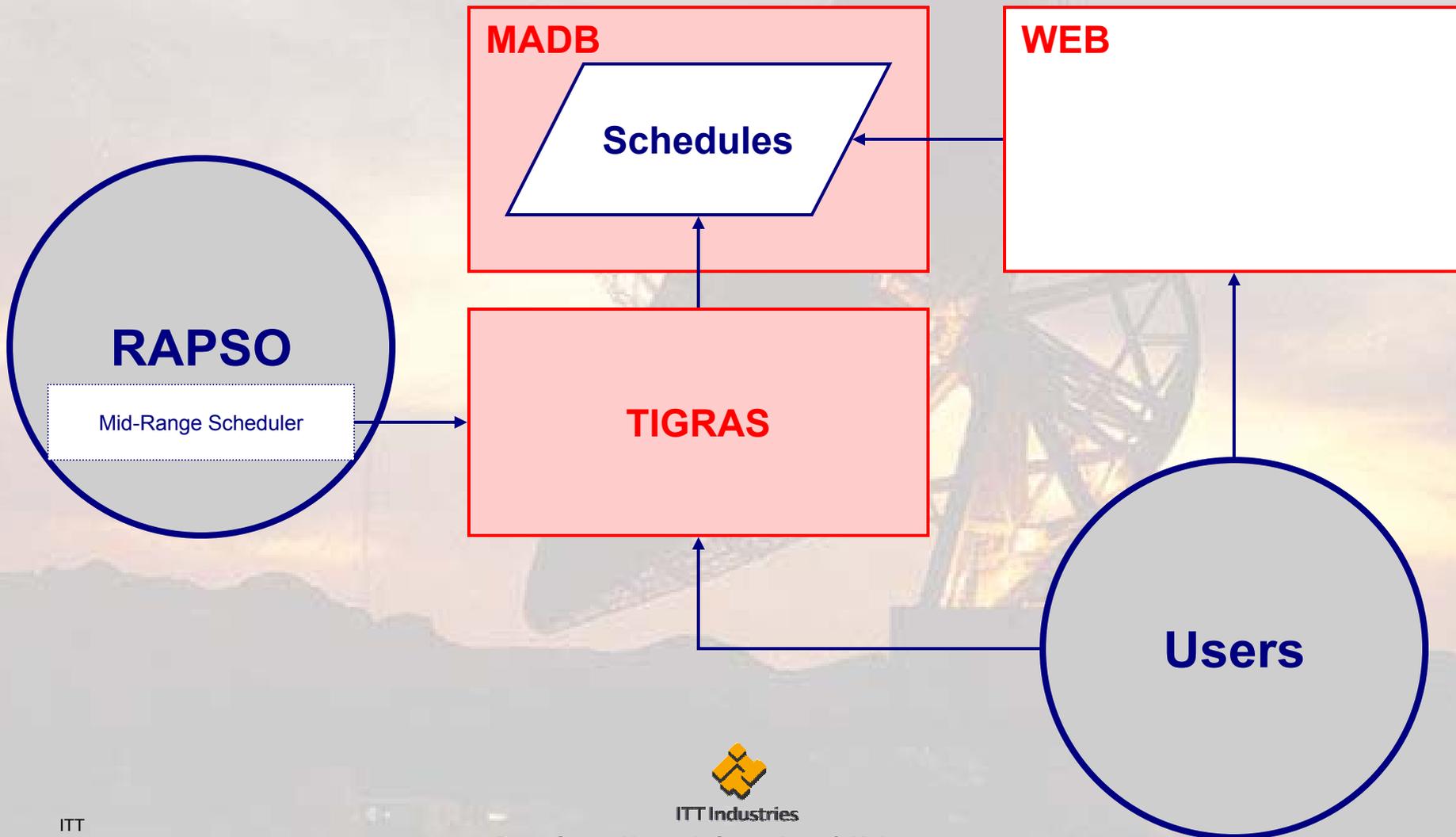




Mission Support Products Engineering



Schedule Viewing



ITT Industries

Deep Space Network Operations & Maintenance